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Construction Methods and Equipment

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April, 1939

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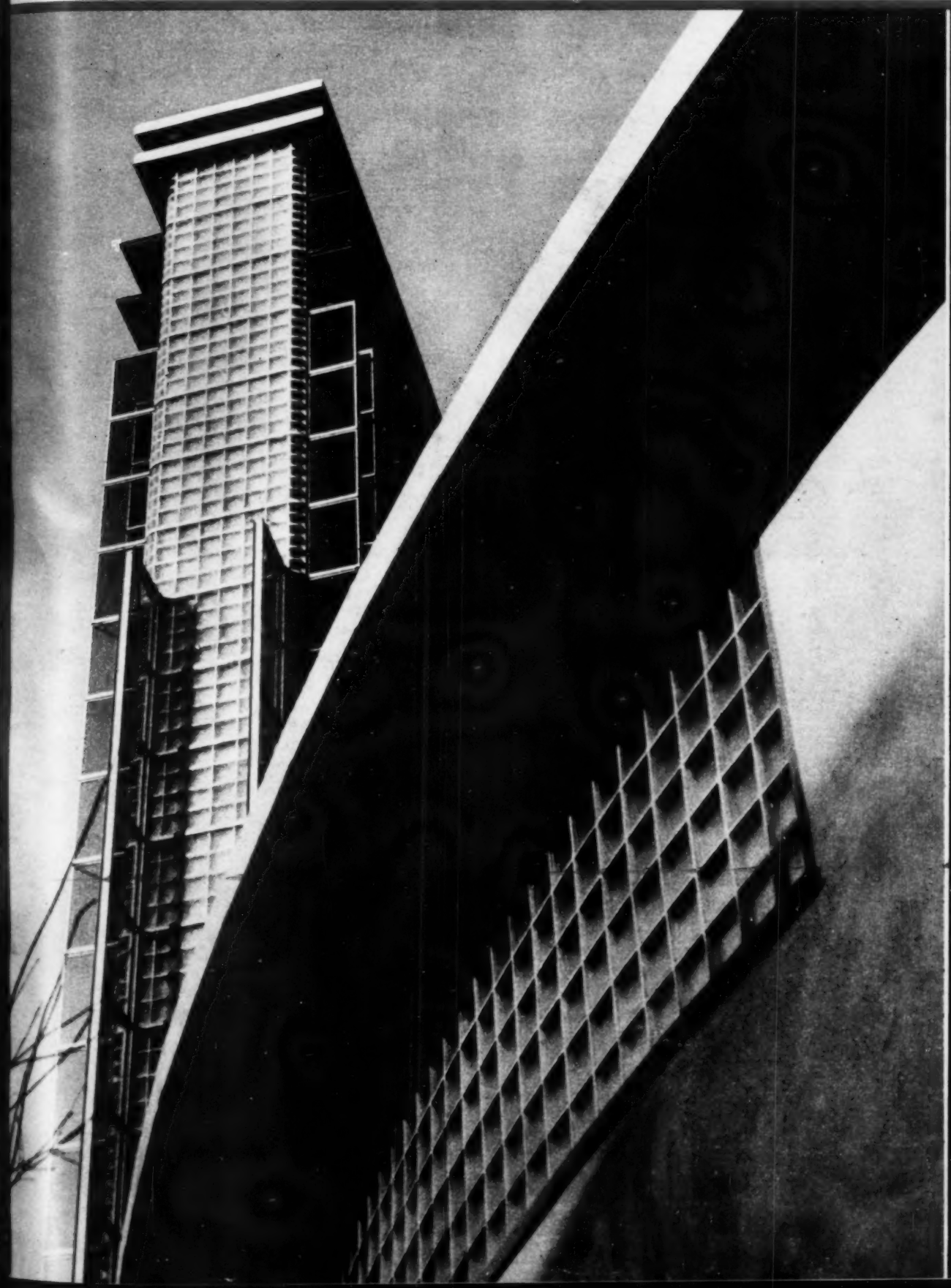

IN THIS ISSUE:

- Structures for New York World's Fair
- Concrete Placement in Dams with Tall Derricks
- Twin Pavers and Traveling Forms on Four-Barrel Sewer
- Improvised Asphalt Plant
- Public Relations in Michigan's Highway Department
- Tractor-Mounted Drill for Rock Sewer Trench
- Driving Sheetpile Bulkhead for Small Bridge
- Concrete Block Paving for Vehicle Tunnel

♥ GLASS BLOCKS and ornamental fins of blue plate glass distinguished 108-ft. tower of Glass Center, one among many examples of interesting applications of building materials to structures at New York World's Fair, open to public this month; four pages of photographs in this issue.

The Biggest Profit is NOT its fuel Economy

Important as it may seem . . . fuel economy is *not the biggest profit* which accrues to owners of Cummins Dependable Diesels. Unless you *know* Cummins dependability, you will miss its biggest savings. ¶ One power failure can eat up the fuel savings on a dozen units. Behind the Cummins Dependable Diesel is a seven-year record for unfailing, day-aftersday performance . . . a record that assures cheap dirt. ¶ With Cummins Dependable Diesels you can substitute certainty for hope . . . proof for expectancy . . . but be careful when you bid against Cummins Dependable Diesels. Cummins Engine Co., 1716 Wilson St., Columbus, Ind.

One of the six Model FC, Mack, 6-wheel units in service of International Nickel Company of Canada, Ltd., at Copper Cliff, Ontario. Load, 130,000 lbs. gross. Powered by Model HB-600 Cummins Diesels.

CUMMINS
Dependable
DIESEL
PIONEER IN MODERN DIESEL DEVELOPMENT

TECHNOLOGY DEPT.

CURRENT JOBS

. . . . and Who's Doing Them

BUILDINGS

Low bid of $2,478,980 was submitted by **R. P. Farnsworth & Co.,** of New Orleans, for completing the Magnolia St. negro housing project in that city. For a tuberculosis hospital building in Jamaica, N. Y., **John Kennedy & Co.,** of New York City, was successful bidder with price of $1,618,000. A $1,353,399 food terminal project in Kansas City, Kansas, was awarded to **S. Patti Construction Co.,** of Kansas City, Mo. In Arrowhead Springs, Calif., **William Simpson Construction Co.,** of Los Angeles, was successful bidder for a group of resort buildings to $1,250,000. General contract for first unit of junior college building group in San Francisco, Calif., went to **Clinton Construction Co.,** local contractor, for $910,000. **Rugo Construction Co., Inc.,** of Boston, submitted low bid of $663,000 for alterations and additions to high school building in Cambridge, Mass. A $640,000 post office garage in St. Louis, Mo., was bid in by **J. S. Alberici,** local contractor. Superstructure for medical ward building, Gallinger hospital, Washington, D. C., will be built by **Bahen & Wright, Inc.,** of Washington, for $807,861. A bid of $647,817 obtained for **Bryant & Detwiler,** of Detroit, contract for college dormitory at Ann Arbor, Mich. Memorial hospital costing $555,000 will be built in Charlotte, N.C., by **J. J. McDevitt Co.,** local contractor. For a high school in Northampton, Mass., **M. J. Walsh & Sons Construction Co.,** of Holyoke, Mass., was successful bidder with price of $579,534. Detroit (Mich.) housing commission awarded $659,000 contract to **A. Smith,** of Chicago, for Brewster housing project. Low bidder on housing project in Dayton, Ohio, was **Ring Construction Co.,** of Minneapolis, with a tender of $749,300. Another Dayton, Ohio housing project was bid in by **Roche, Connell & Laub Construction Co.,** of Cincinnati, for $582,000. General contract for high school in Oshkosh, Wis., was awarded to **B. G. Gunther Co.,** of Oshkosh, for $598,000. To **Platt Rogers Construction Co.,** of Pueblo, Colo., went a $425,160 high school contract in Colorado Springs.

In Seattle, Wash., **Roosevelt Building Corp.,** of Los Angeles, Calif., will build a $1,000,000 16-story hotel. A $8,000,000 textile plant at Seaford, Del., for the manufacture of Nylon thread, will be built with its own forces by the **DuPont Co.,** of Wilmington, Del.

DAMS AND EARTHWORK

For the Santee Pinopolis dam and power project in South Carolina, low bidder was **Central Engineering Co.,** of Davenport, Ia., with price of $4,172,180; on the same project bid of $4,357,427, was received from **United Construction Co.,** of Winona, Minn. and **Maxon Construction Co.,** of New Boston, Ill. At Raymondville, Tex., irrigation project will be built by **Cement Gun Co.,** of Allentown, Pa., for $1,077,731. **Macco Construction Co.,** of San Francisco, will build aircraft landing field at San Bruno, Calif., for $443,400. Contract for flood control project on Connecticut River at Springfield, Mass., went to **Daniel O'Connell Sons, Inc.,** for $278,572. **Caldwell Engineering Co.,** of Jacksonville, Ill., will build a $750,000 hydro-electric project near Huntington, Ind.

SUBWAYS

For the new subway in Chicago, Ill., contracts awarded for various sections of the work were made as follows: **J. Griffiths & Son,** of Chicago, $2,823,816; **John Marsch, Inc.,** of Chicago, $2,094,766. Chicago's Commissioner of Public Works awarded a $1,679,250 tunnel contract to **Leininger Construction Co.,** of Chicago.

BRIDGES

For substructure and approaches to Potomac River bridge at Ludlow Ferry, Md., successful bidder was **Merritt, Chapman & Scott Corp.,** of New York City, with price of $2,089,324. Substructure for Mississippi River bridge at Rock Island, Ill., was bid in for $426,998, by **McCarthy Improvement Co.,** of Davenport, Ia. Contract amounting to $888,932, for grade crossing elimination in Staten Island, New York, went to **Poirier & McLane Corp.,** of New York City. Overpass in Cambridge, Mass., costing $264,861, is under construction by **Coleman Bros. Corp.,** of Boston. Overhead structure on California State Highway near Turlock, went to **Union Paving Co.,** of San Francisco, for $284,102. Grade separation on Cross Island Parkway, Long Island, New York, will be built for $597,794, by **Good Roads Engineering Co.,** of Wantagh, N. Y. Low bid of $534,300 for substructure of bridge at Greenville, Miss., was submitted by **F. V. Ragsdale Co.,** of Memphis, Tenn. In Cleveland, Ohio, **National Engineering & Contracting Co.,** local contractors, will build $376,394 ramp for Main Ave. bridge.

HIGHWAYS

Among recent contract awards for highways are the following: Mississippi: $357,903 to **A. Guthrie, Inc.,** St. Paul, Minn.; $370,447 to **Chadler Bros., Inc.,** of Virgilinia, Va.; $263,788 to **Hooper Construction Co.,** of St. Augustine, Fla. New York: $993,030 to **P. Tomasetti Contracting Corp.,** of Brooklyn. Pennsylvania: $988,713 to **Booth & Flinn Co.,** of Pittsburgh; $663,165 to **County Construction Co.,** of Carnegie, Pa.; $505,092 to **Guthrie, Marsh & Peterson Co.,** of Chicago; $773,918 to **Empire Construction Co.,** of Baltimore. New Jersey: $488,328 to **Weldon Contracting Co.,** of Westfield; $360,119 to **Gray Construction Co.,** of Morristown. Illinois: $210,661 to **Moore Bros., Inc.,** of East St. Louis, Ill.; $335,409 to **A. J. Shanks Construction Co.,** of Watseka, Ill.

Construction Methods and Equipment

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APRIL, 1939

ROBERT K. TOMLIN, Editor
A. E. PAXTON, Manager

Editorial Staff: Vincent B. Smith, Paul Wooton (Washington), Nelle Fitzgerald

A McGRAW-HILL PUBLICATION

The "How" of it

For the benefit of readers concerned with the practical application of method or equipment the following references are to articles or illustrations in this issue that tell:

How CONSTRUCTION ORDERS on 26-acre residential building job were broadcast through loudspeaker system. — p. 33

How BUILDING MATERIALS cover wide range of applications in structures for New York World's Fair. — p. 36

How MECHANICS USED GAGES to assure uniform horizontal joint spacing while driving holes for screws. — p. 37

How NOVEL TEXTURE for exterior surface of exposition building was obtained by sandblasting redwood siding. — p. 38

How WATERPROOFING COMPOUND was sprayed between two layers of gypsum sheathing. — p. 39

How TALL GUY DERRICKS placed 250,000 cu.yd. of concrete in dam and power house. — p. 40

How CURING OF CONCRETE in dam was accomplished by keeping fabric mats wet with sprinklers. — p. 42

How FOUR-BARREL SEWER was concreted with traveling forms fed by chutes from twin paving mixers. — p. 44

How STEEL H-POSTS concreted in two interior walls of sewer carried timber cribbing on which concrete mixer rested. — p. 45

How CINDER SPREADER was shop built to give fast roadway coverage. — p. 46

How SPECIALIZED MACHINES put finishing touches on concrete pavement for causeway approach. — p. 47

How TWO-COLOR TRAFFIC LINE was built into concrete pavement. — p. 47

How SALVAGED MATERIAL and parts were used to build asphalt plant. — p. 48

How SHOVEL ATTACHMENT on tractor loaded 2-ton stone into truck. — p.50

How FACE OF CURB FORM was keyed to division plates to eliminate obstructions above top to chute of truck-mixer.—p. 50

How SAND BLAST was used to clean steel reinforcement for penstock. — p. 51

How SODS for highway slopes were delivered by small sled on board track. — p. 51

How CEMENT GROUT FILLER for brick pavement was delivered by chute from mixer on rolling gantry. — p. 51

How PUBLIC RELATIONS PROGRAM aided operation of state highway department. — p. 52

How JOB-MADE MANDREL put weep-pipes in concrete.— p.56

How VEHICLE TUNNEL WAS PAVED with concrete blocks. — p. 57

How TRACTOR-MOUNTED DRILL speeded progress in rock trench for sewer. — p. 58

How SHEETPILE BULKHEAD was driven in restricted quarters. — p. 60

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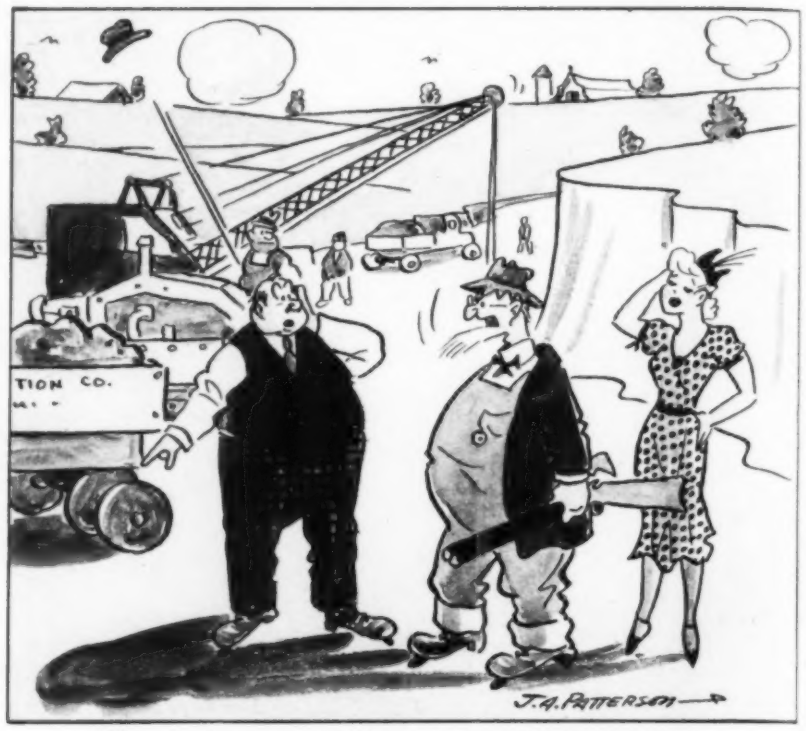


"She says he runs a bulldozer 'er somethin' like that!"

"You know, politics and influence, just another one of those things."

"I've got the jitters this morning, Ed!"

TEN YEARS AGO LAST OCTOBER

AN almost continuous stream of trucks uses the driveway to Hibbard, Spencer & Bartlett's Chicago warehouse. Ten years ago last October, this driveway was resurfaced with 'Incor'. Placed Saturday and Sunday, opened 23 hours after last pour — without interrupting business.

Today, after 10 years' hardest service, concrete in first-class condition—NO MAINTENANCE EXPENSE.

Proving 'Incor's two-way saving to industry: (1) No plant tie-ups waiting for concrete to harden; (2) money saved on maintenance.

'Incor' provides two-way assurance — dependable high-early strength and proven long-time durability. Use 'Incor'* where 24-hour service and faster job curing show you a profit; elsewhere, use Lone Star, the standard of Portland cement quality for over a quarter of a century.

Written guarantee certificate (shown above) with every shipment, assures quality equal to or exceeding standard specifications. Write for copy of "Cutting Concrete Costs." Lone Star Cement Corporation, Room 2264, 342 Madison Avenue, New York.

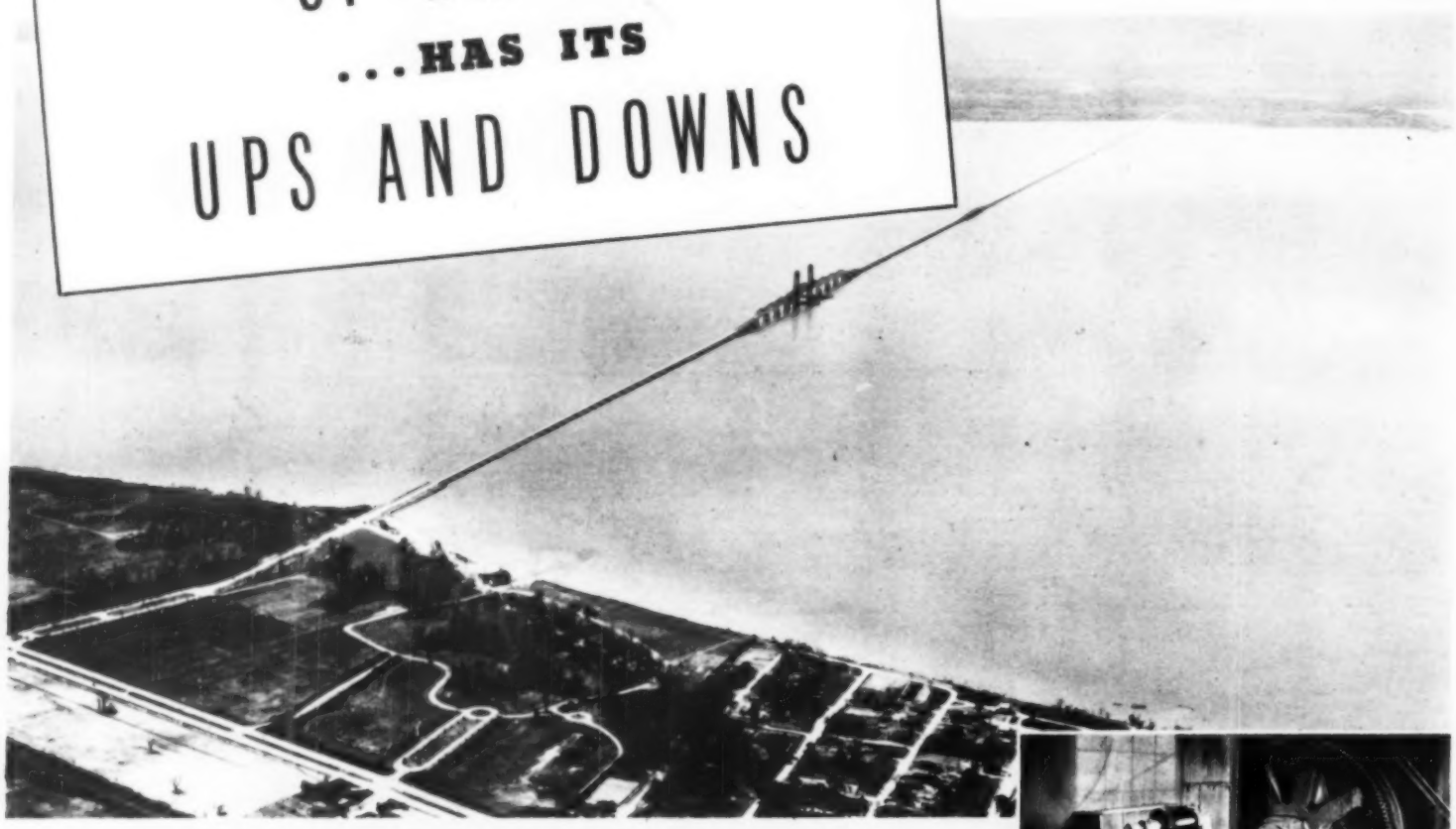
*Reg. U. S. Pat. Off.

LONE STAR CEMENT CORPORATION

MAKERS OF LONE STAR CEMENT • • • 'INCOR' 24-HOUR CEMENT

Sales Offices: ALBANY, BIRMINGHAM, BOSTON, CHICAGO, DALLAS, HOUSTON, INDIANAPOLIS, JACKSON, MISS., KANSAS CITY, NEW ORLEANS, NEW YORK, NORFOLK, PHILADELPHIA, ST. LOUIS, WASHINGTON, D. C.

A MILLION POUNDS OF BRIDGE ...HAS ITS UPS AND DOWNS



FAMOUS HIGHWAY SHORT-CUT across the James River at Newport News, Virginia. 4½ miles in length, the draw is 300 feet long and lifts 100 feet, giving a clearance of 150 feet above tidewater to permit passage of battleships and other craft.

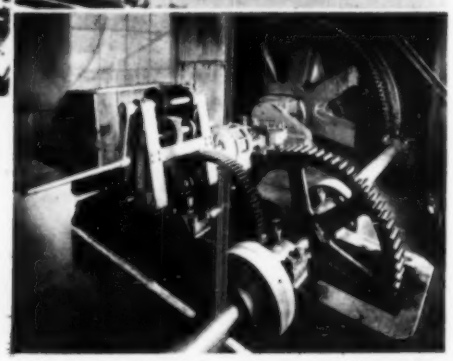
THIS 4½-MILE HIGHWAY structure across the James River at Newport News, Virginia, opened to traffic in 1928. Ever since then, the gears, pinions, and wire rope of the draw have had no other lubricant than Texaco Crater Compound.

For 10 years, Texaco Crater Compound has kept these gears and wire rope protected from undue friction and weather, never failing to meet all demands made upon it.

To get trouble-free service from exposed gears and wire rope, get in touch with Texaco. Texaco's lubrication engineers will help you make a sound selection. And Texaco's 2229 warehouses will make prompt delivery wherever you are.

To order any Texaco Lubricant for any purpose, phone the nearest warehouse or write:

The Texas Company, 135 East 42nd Street, New York City.



SIMILAR MECHANISM in each tower lifts a draw that weighs a million pounds. Baked in summer, frozen in winter, it's a tough spot for any lubricant. Nothing but Texaco Crater Compound has been used on these gear teeth or the wire rope.

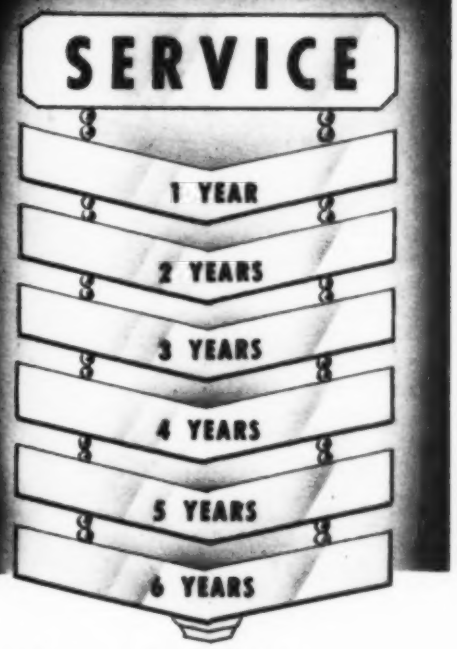
ON PINIONS AND GEARS like these, Crater Compound clings, resisting the natural wiping action of gears in mesh, protecting against metallic contact.

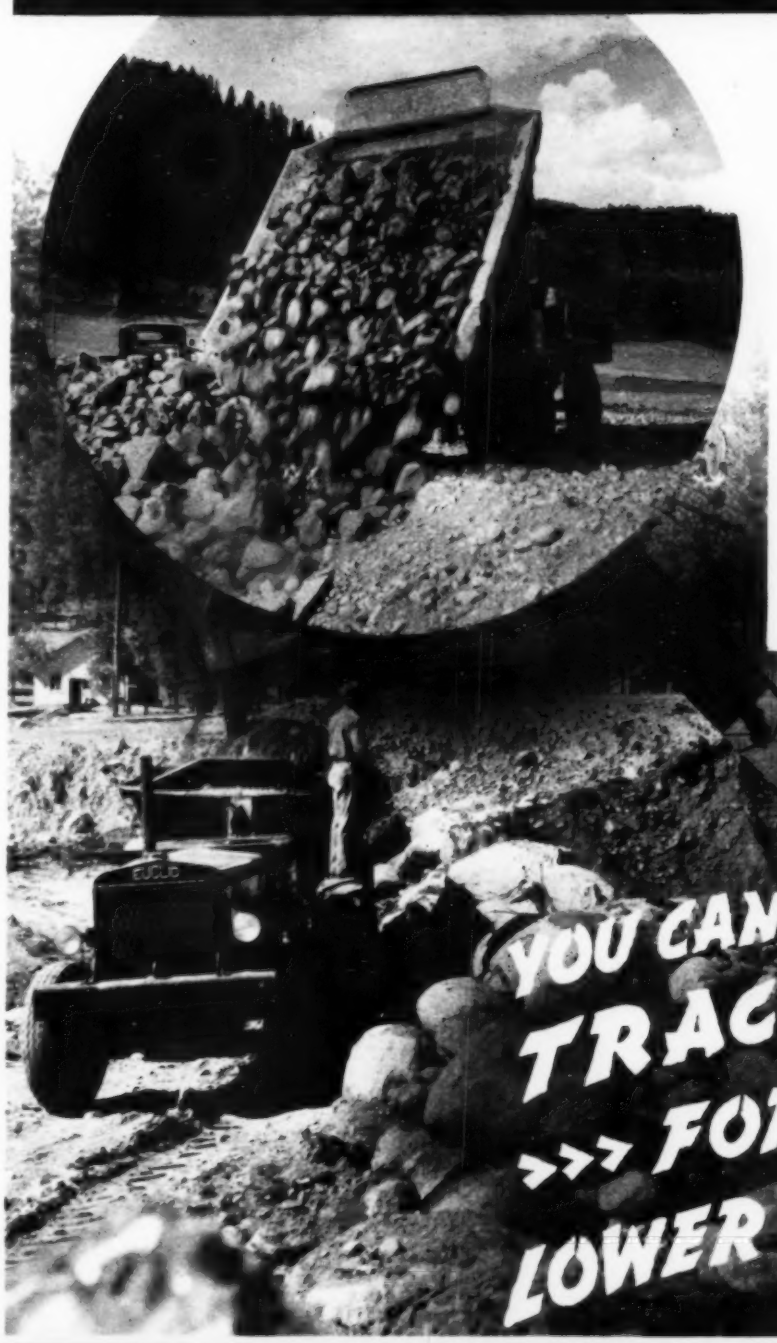
THIS CRATER COMPOUND BOOKLET—32 pages of practical information relating to open gear teeth and wire rope protection. A copy is yours for the asking.

TEXACO Crater Compound

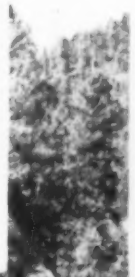
Chevrons for the Veterans

AFTER 6 YEARS OF SERVICE TRAC-TRUKS ARE STILL SHOWING A PROFIT FOR MARTIN WUNDERLICH





Here's concrete evidence of Trac-Truk Stamina. Six years ago Martin Wunderlich bought 11 8-yard Rear-Dump Trac-Truks. Since that time these units have been all over the Rocky Mountain territory . . . giving day-in and day-out trouble-free service. A year ago they went to work on the Vallecito Dam, one of the biggest and toughest projects in America. The photo to the left shows a veteran Trac-Truk still going strong . . . and so are the other 10 original units on this job. Below is a modern 15-yard Bottom-Dump Trac-Truk, one of a fleet of 8 that went to work on this same project last year. It's service like this that makes Trac-Truks the No. 1 choice in the earth moving field . . . a choice based on their Performance and Ability to haul more dirt at the lowest per yard cost. Trac-Truks Increase the Profit Margin!



YOU CAN DEPEND ON TRAC-TRUKS FOR SERVICE AND LOWER HAULING COSTS

THE EUCLID ROAD MACHINERY CO.
CLEVELAND, OHIO U. S. A.
BRANCH OFFICE 185 EAST BUTLER AVENUE, MEMPHIS, TENN.

EUCLID
THE PIONEER

"TIP TOP" IN

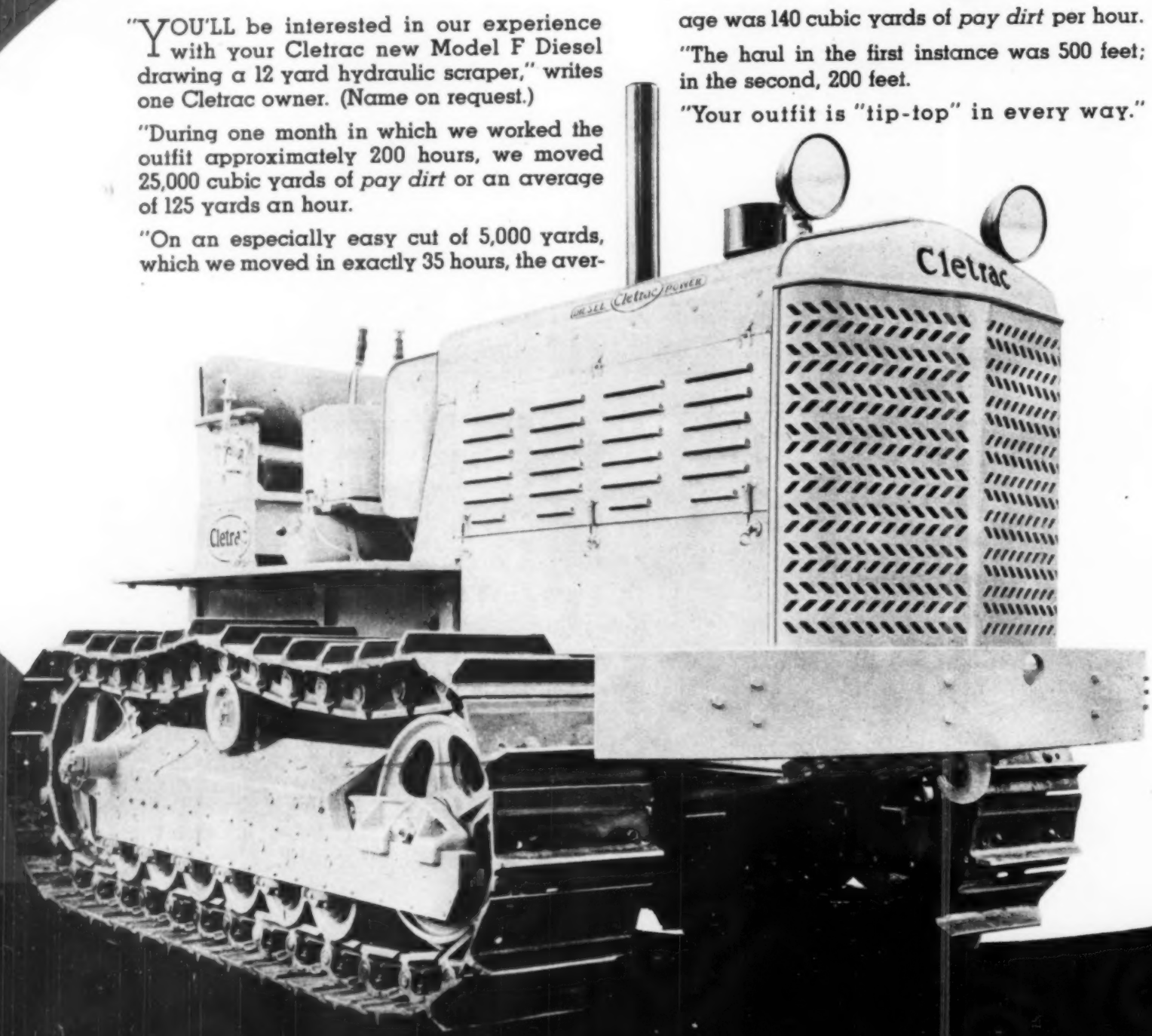
"YOU'LL be interested in our experience with your Cletrac new Model F Diesel drawing a 12 yard hydraulic scraper," writes one Cletrac owner. (Name on request.)

"During one month in which we worked the outfit approximately 200 hours, we moved 25,000 cubic yards of *pay dirt* or an average of 125 yards an hour.

"On an especially easy cut of 5,000 yards, which we moved in exactly 35 hours, the average was 140 cubic yards of *pay dirt* per hour.

"The haul in the first instance was 500 feet; in the second, 200 feet.

"Your outfit is "tip-top" in every way."



EVERY WAY

WHETHER operating under "easy" conditions or "tough" going, every feature of Cletrac design and construction is planned to give "tip-top" performance every hour—every day.

With electric starting, for example, Cletracs are on the job faster in the morning.

Cletracs are properly balanced without unnecessary weight. The weight saving alone means as much as 19% greater pay load on a 30% grade.

Cletracs are "tip-top" for another reason—Controlled Differential Steering. This feature—exclusive with Cletrac—keeps both tracks pulling at all times. There's no loss of power by stopping one track. You handle larger loads on the turns... maneuver the tractor more easily... turn more smoothly.

It's Cletrac "tip-top" performance, capacity, economy and dependability that keeps difficult jobs on schedule and earns bonuses on the easier ones.

Best of all, there's a Cletrac size and model from 14 to 95 horsepower—either gasoline or Diesel—to fit any job. You can choose the right size for your operations. Ask the nearest distributor for an on-the-job demonstration.

THE CLEVELAND TRACTOR CO.
CLEVELAND, OHIO

Cletrac
REG. U.S. PAT. OFF.
Crawler Tractors
Built To Endure

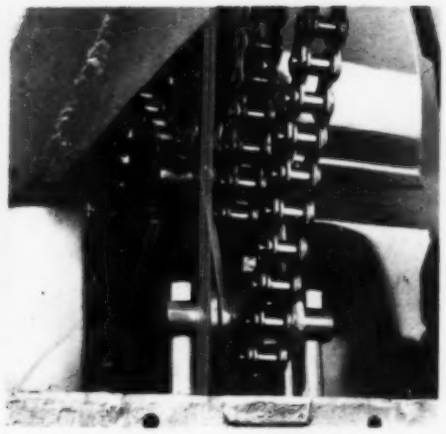
14-95 HORSEPOWER • •
GASOLINE OR DIESEL

Cletracs do not "turn on a dime," but note the short turning radius through Controlled Differential Steering.

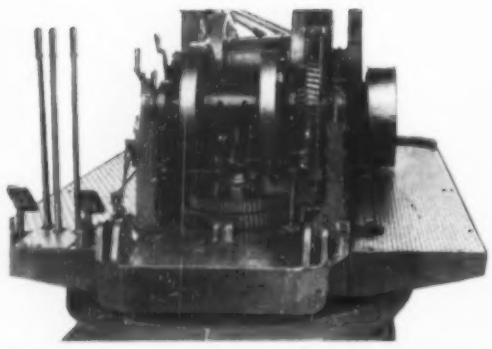
This Cletrac Diesel of 95 h. p. handles a twelve yard scraper with ease. Fuel-consumption is remarkably low.

Two 94 h. p. Cletracs with bulldozers move full blades of dirt. Cletracs handle easily—are back for another load in a hurry.

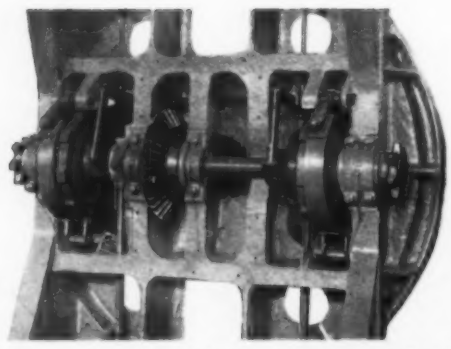
SHOVEL FEATURES
like these COST NO MORE when you buy a BAY CITY



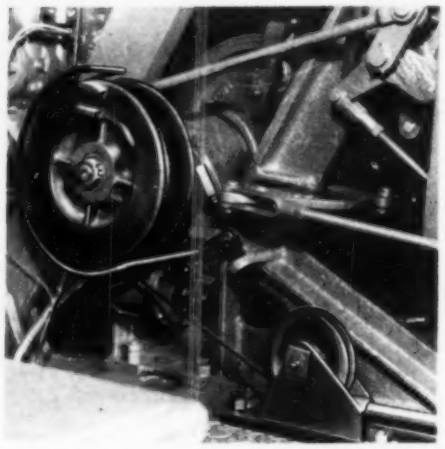
All BAY CITY Shovels from ¾ yd. up are standard equipped with heavy duty single piece powerful chain crowd mechanism—independent and positive. Automatic chain adjustment maintains proper tension at any boom angle.



Quiet, powerful helical gears—tandem drums—anti-friction bearings throughout—3 lever control with booster operated clutches—boom foot lugs cast integral with unit-cast alloy steel revolving table—ample room around machinery and inside cab.



Working time is the only time to count in figuring yardage. Fast, easy travel and steering with BAY CITY design by simply applying pressure on cone clutches that operate brakes. *No jaw clutches or brakes to set.* Automatic propelling chocks hold machine while working.



Don't criticize your operator for low production, unless he has the advantage of this exclusive Electric Dipper Trip which adds from 10 to 15% to daily yardage. Push button control on top of swing lever grip just where needed.

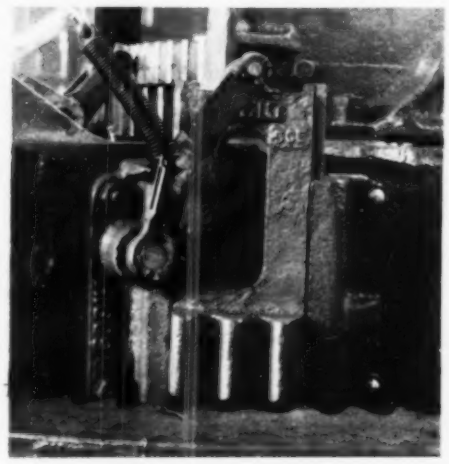
. . . because they are STANDARD

SO many of our new customers—former users of other machines—are so enthusiastic about the operating advantages of the BAY CITY, that we realized maybe it's our fault you do not know about the many money-making features. So for the first time in these pages, we review some of the more important features that result in lower operating and maintenance costs—bigger yardage—easier operation—faster speeds—greater power. Look them over, then write for a complete description contained in Catalog H-2.

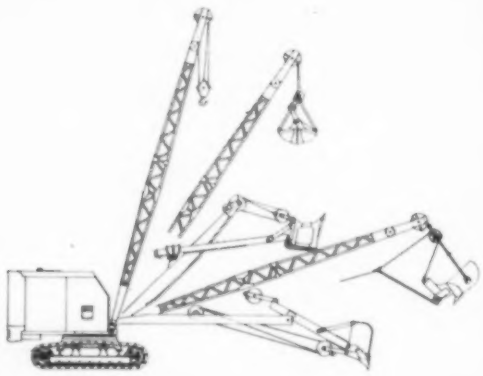
BAY CITY SHOVELS, Inc., Bay City, Mich.

Export office: H. M. Hein, 330 W. 42nd St., New York City

Long, wide crawlers provide low ground bearing pressure at no extra expense and drop forged crawler shoes with drilled pin holes and alloy pins give greater wear, thus reducing one of the largest single items of shovel up-keep. Drop forged crawler rollers and special heat-treated drive sprockets, also standard.



Here is a feature that saves money—if time means money on your job. This sturdy, patented swing lock engages positively in bull gear and will hold in any position of the circle. Operated by foot lever from inside cab.



FULLY CONVERTIBLE

All BAY CITY machines follow the same general design and are fully convertible without machinery change. Use them as shovel, crane, clam, drag or trench-hoe for bigger performance at lower operating and maintenance cost.

BAY CITY SHOVELS

ALL BUT UNANIMOUS!

More than 50 manufacturers of Diesel engines and equipment—*leaders of American industry*—depend on American Bosch Fuel Injection Equipment. To their customers they can give the confident assurance that American Bosch represents the oldest and most authoritative fuel injection intelligence in America; time-tested in engineering and manufacture; and offering nation-wide, world-wide servicing facilities.

AMERICAN BOSCH CORPORATION
SPRINGFIELD, MASSACHUSETTS

AMERICAN BOSCH

Fuel Injection Equipment

STANDARD OF AMERICA — WORLD WIDE SERVICE

11 MODELS IN FOUR SIZES

TWO 3/8 YD. MODELS
Bearcat Jr. . . . 15,000 lbs.
Model 55 . . . 25,000 lbs.

TWO 1/2 YD. MODELS
Model 60 . . . 28,400 lbs.
Model 65 . . . 30,000 lbs.

ONE 5/8 YD. MODEL
Model 75 . . . 32,000 lbs.

TWO 3/4 YD. MODELS
Model 83 . . . 36,000 lbs.
Model 80 . . . 48,000 lbs.

ALSO FOUR TRUCK CRANES AND SHOVELS
Gas or Diesel Power

The Captain Sails the High Seas

BUT THE HARBOR PILOT DOCKS HER

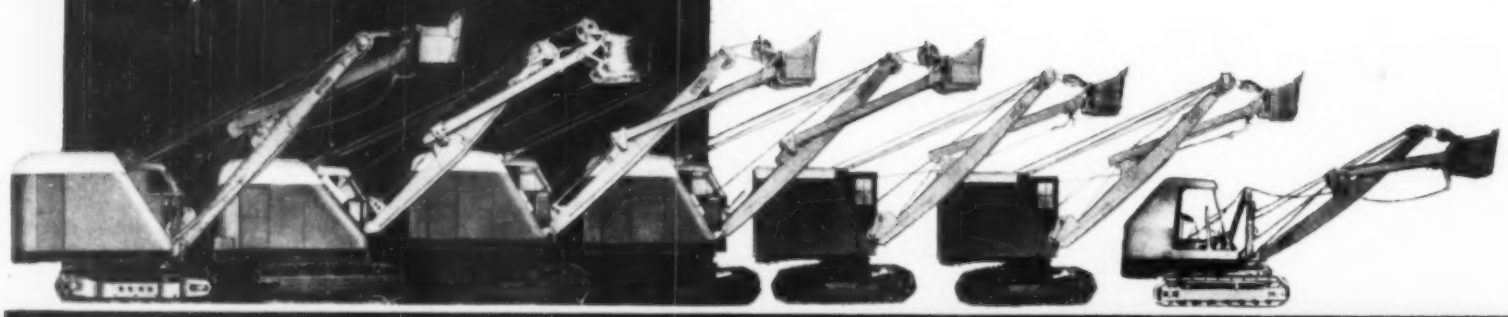
● From some far off port to New York the sea captain successfully navigates his great ship. But he steps aside to let the harbor pilot safely dock his liner. This pilot is a specialist. He knows more about New York Harbor, its tides and currents, its channels, shallows, and other peculiarities than anyone else. He has had years of experience bringing vessels safely through this busy harbor. Thus the captain profits from the harbor pilot's special knowledge.

Likewise, you can profit from the special knowledge and experience of a manufacturer who specializes in building 3/8, 1/2, 5/8 and 3/4 yd. shovels and cranes when you need one of these four portable sizes.

The outstanding specialist in *portable* sizes of shovels and cranes is The Byers Machine Co. Byers offers you your choice of two different 3/8 yd. models, two 1/2 yds., two 3/4 yds.—in addition to 5/8 yd. and four truck cranes for special applications.

Byers service in the portable field is near you with a nation-wide network of reliable local equipment distributors upon whom you can depend.

Why not, like the sea captain, profit from Byers specialized knowledge, Byers long experience and Byers 11 different models in the four smaller sizes of shovels and cranes? Inquire today for catalogs and job performance reports.



BYERS

SHOVELS • CRANES • DRAGLINES • TRENCH HOES

THE BYERS MACHINE CO., RAVENNA, O.
Distributors throughout the World

SPECIALIZING IN
3/8 • 1/2 • 5/8 • 3/4 YD. MODELS

for LOWEST COST PER GALLON

Use JAEGER Sure Prime Pumps

Only in a Jaeger do you get the Patented Priming Jet for fastest known 100% automatic prime, Patented Lubri-Seal for long-life, perfect sealing, Patented Self-Cleaning Shell and Jaeger Open Impeller for handling dirty water in maximum volume, without clogging or a sign of wear, thru thousands of hours of heavy service. Jobs are safer, dewatering costs lower with a Jaeger. Get our Catalog and Prices.

THE JAEGER MACHINE CO.
800 Dublin Ave., Columbus, Ohio

Ahead on All Three!

- **CAPACITY (Lays Material Faster than Most Plants Can Mix It)**
- **ADAPTABILITY (Lays Stone, Macadam, Hot or Cold Mixes—Widths to 14 Ft.)**
- **SMOOTHNESS (Equivalent to Form Job)**

Capacity exceeds 100 tons an hour on many jobs. Long equalizing runners act as movable forms. Weight and traction are confined to hard subgrade. Lays wide widths, blends joints, paves flush to curb or header — cuts costs, does better job. Send for Catalog.

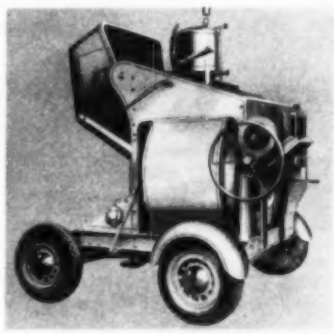
THE JAEGER MACHINE CO., 800 Dublin Ave., Columbus, Ohio
World's Largest Builder of Spreading and Finishing Machines

JAEGER Bituminous PAVER

JAEGER'S LATEST SPEEDLINE

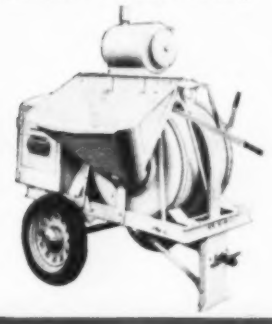
End Discharge 7S to 14S Trailers

Again the world's biggest mixer manufacturer puts you a long jump ahead — gets you to your 1939 jobs faster, saves you 50% street room, starts you pouring quicker, steps up your daily yardage with a modern designed speed mixer — the fastest, easiest handling, lightest yet huskiest mixers Jaeger has ever built. These 1939 Speedlines are not to be compared with flimsy "lightweight" mixers, tho they sell at outstandingly low prices. Get Catalog.



2 or 4-WHEEL MOUNT, INTERCHANGEABLE
Machined Steel Drum Tracks
Not Found in "Lightweights."
Bigger Engines, Bearings, etc.
Skip Shaker Loader
"Pressure" Discharge
Criss-Cross "Re"-Mixing
Springs, Timkens and
Pneumatics for Fast Trailing

UTILITY MIXER WITH FAST MEASURING BATCH HOPPER
Load while you mix and discharge — get up to 40 cu. yds. a day, all most jobs can handle. Costs hundreds of dollars less than heavy 5S Non Tilts. Get our figures.



THE JAEGER MACHINE CO.
800 DUBLIN AVE., COLUMBUS, OHIO
PUMPS—HOISTS—TOWERS—PAVING EQUIPMENT

Double-Barreled

THAT BRINGS HOME EXTRA PROFIT

"Get it done — beat that schedule — save that penalty — increase the profits!" . . . It's the theme-song of every wide-awake contractor — the platform for profit — the key to successful bidding.

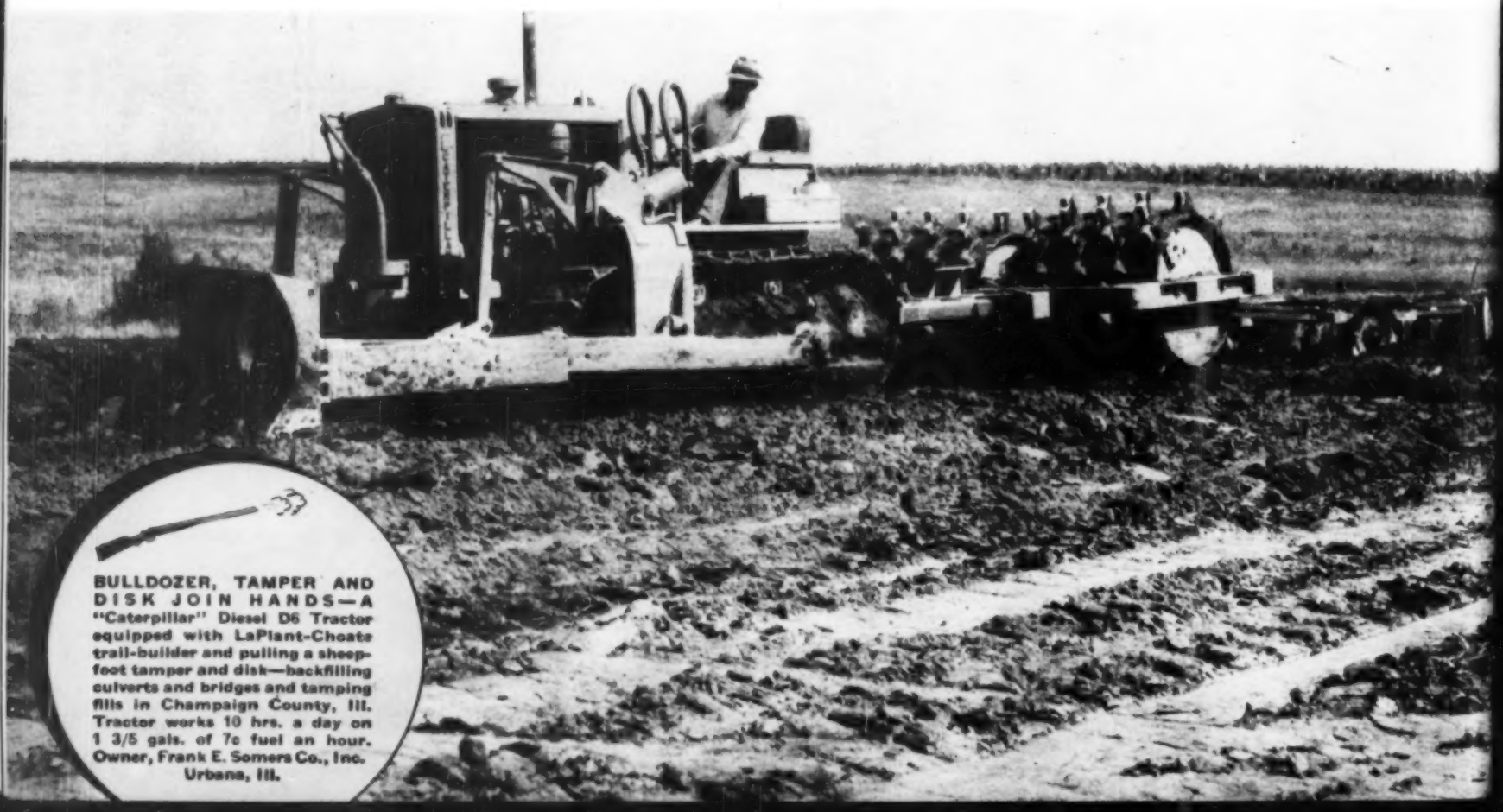
Doing two or more things at once — saving time, operating steps, "mileage" wear-and-tear — is a tremendous factor nowadays. "Caterpillar" Diesel Tractors provide the means for "doubling up." With their ruggedness, stamina and power-to-spare, they can handle multiple or single equipment; work on many and varied jobs — keeping busy, speeding the project, minimizing idle overhead, and writing off their original investment long before they near the end of their serviceable life.

Speaking of the "Caterpillar" Diesel-powered unit pictured at the right, Cy Breeden (of Breeden Bros. Construction Co.) says: *"It may be that you cannot point to any one item and say that it alone is worth the cost, but for the many things it can do it will pay for itself in a short time."*

And when you observe the many uses to which Breeden Bros.' equipment is put, you can appreciate the money-making versatility of "Caterpillar" Diesel Tractors teamed up with the products of leading manufacturers of contracting equipment.

No less interesting is the outfit owned by Frank E. Somers Co., Inc., likewise shown here — as are also Vice-President H. E. Buckner's views on the subject of how to get the most out of construction equipment.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS



BULLDOZER, TAMPER AND DISK JOIN HANDS—A "Caterpillar" Diesel D6 Tractor equipped with LaPlant-Choate trail-builder and pulling a sheep-foot tamper and disk—backfilling culverts and bridges and tamping fills in Champaign County, Ill. Tractor works 10 hrs. a day on 1 3/5 gals. of 7c fuel an hour. Owner, Frank E. Somers Co., Inc. Urbana, Ill.

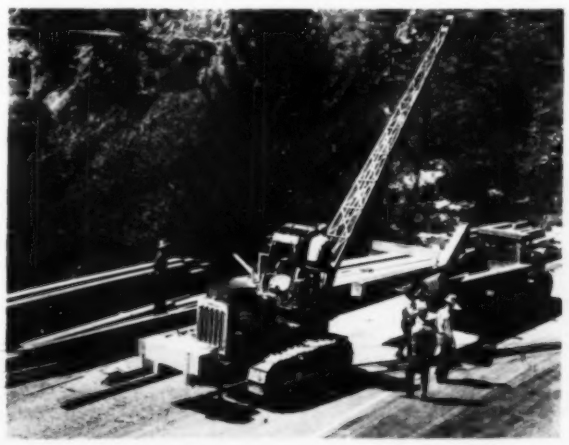
Equipment

SHOVEL, DISK AND ROLLER WORK AS ONE—A "Caterpillar" Diesel D4 Tractor equipped with Trackson high shovel, and drawbar-hitched to disk and pneumatic-wheel roller. Leveling, disking and compacting together on road fill near Galva, Ill. Working 8 hrs. a day on 1½ gals. of 8½c fuel per hour. Tractor-shovel unit is also used for ditching and laying culvert pipe; cleaning out and piling hedge for burning; excavating test pits; pulling fence posts; loading oil barrels, pile-driver leads, hammers and other heavy items for moving. (Loaded 959 cu. yds. of rock and compacted street in 3 days; also took overburden off gravel and loaded 300 yds. in 2 days.) Owner, Breeden Bros. Construction Co., Fulton, Ill.

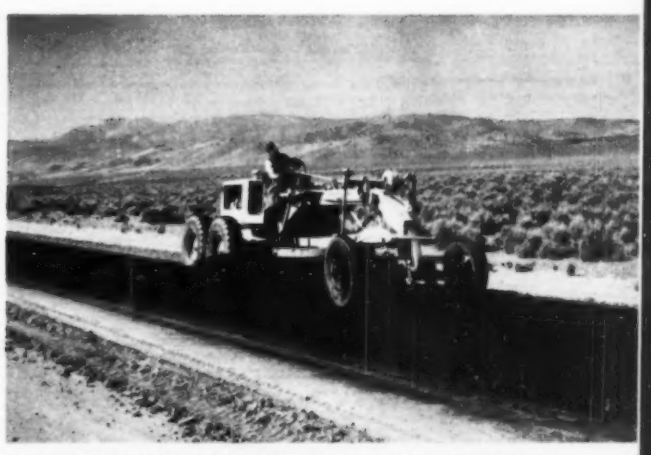
EQUIPMENT MAINTENANCE AS IMPORTANT AS PRODUCTION

Like Frank E. Somers Co., Inc., many contracting concerns are combining the responsibility for machinery maintenance with that for production—on the sound reasoning that hours spent in keeping equipment fit can save many days sure to be lost by holding it on the job until it develops serious job-halting trouble. On this point, H. E. Buckner, Vice-President of the above company, writes:

"Since the purchase of this 'Caterpillar' equipment, we have given the construction superintendent complete charge of tractor maintenance. Each unit is checked and greased daily. Oil is changed with every 40 hours' operation. A tractor developing minor mechanical needs is pulled from the job and gone over. No 'crippled' or 'ailing' equipment is permitted to remain on the job. . . . We are more than pleased with the performance of our 'Caterpillar' Diesel Tractors. They will continue to be given the proper care that all good machinery should receive."



BRIDGE-BUILDING—A Speeder crane, mounted on a "Caterpillar" Diesel Tractor, tearing down an old highway bridge and setting posts for a new one. (Each post weighs 5000 lbs.) Works 8 hours a day on 1½ gallons of 7½-cent fuel per hour. Location, Bridges Creek, near Garberville, California.



"CATERPILLAR" DIESEL No. 12 AUTO PATROL doing oil-mix work along Pyramid Road, near Reno, Nev. Has double capacity of machine formerly used. Note high front-axle clearance. Full-revolving, high-reach, ample-clearance blade enables forward-or-backward blading, high bank cutting, deep ditching.

CATERPILLAR

TRACK-TYPE TRACTORS • DIESEL ENGINES • ROAD MACHINERY

A SIZE AND MODEL FOR EVERY CONSTRUCTION NEED

LONGER BOOMS
MORE LIFTING CAPACITY
LOWER GROUND PRESSURE

-than any other dragline of its size

You'd have to buy the next larger capacity of any other dragline to match these important P&H advantages common to P&H Models 855 (2 yd.) and 955 (2 1/2 yd.)

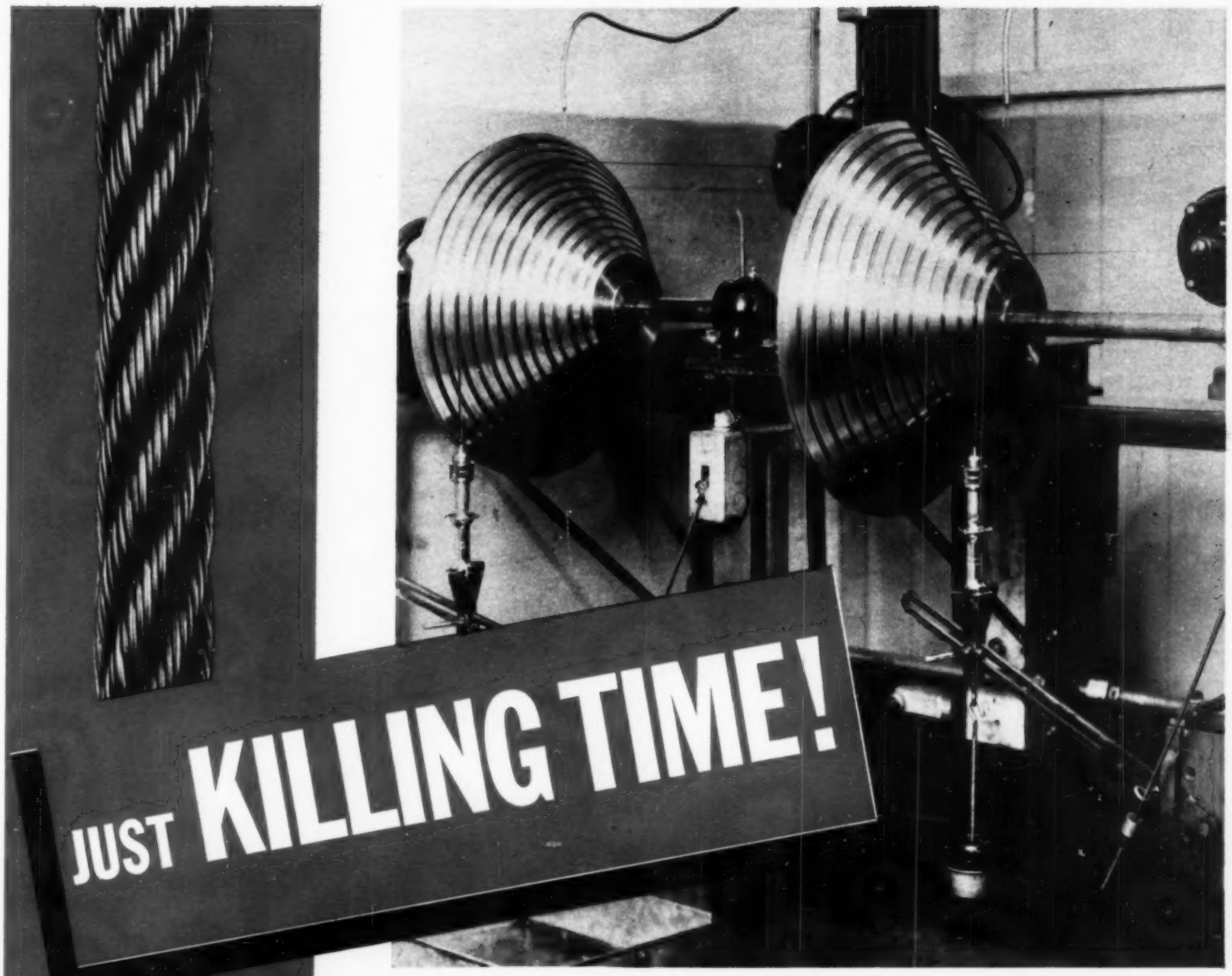
P&H makes these advantages possible through rigid, welded construction of alloy steels, proper weight, balance of upper structure and liberal Diesel power. Synchronized motions controlled by split-second clutches and larger brakes make these P&H's the smoothest-running 2 and 2 1/2 yard friction machines ever built.

P&H EXCAVATORS
18 Different Sizes
From ½ to 3 cubic yards Capacity; Gasoline, Diesel or Electric Power.

Write for literature on the size and type that interests you. Harnischfeger Corporation, 4494 W. National Avenue, Milwaukee, Wisconsin.

HARNISCHFEGER
CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS



IN BUILDING LIFE INTO WICKWIRE ROPE BEYOND SPECIFICATIONS

Yes, killing time . . . but saving you money! This odd looking device is the latest development in a fatigue testing machine . . . it kills time because in a few hours it gives the wire under test as much punishment as it would receive in years of actual service.

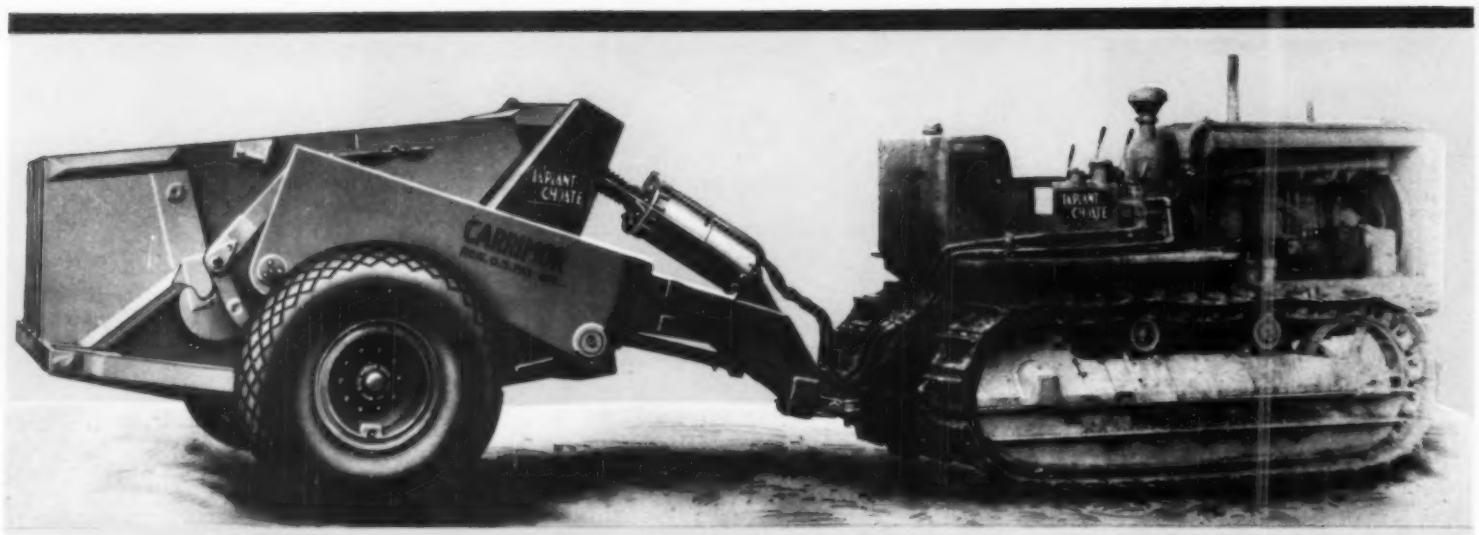
As a result of these tests, we can determine how to draw the long-lived wire that we use in making Wickwire Rope. Thus you can bend and unbend Wickwire Rope over your sheaves and still be sure of getting your money's worth for every rope dollar you spend.

WICKWIRE ROPE

It is still the privilege of the progressive manufacturer to build rope life into his product beyond officiel specifications.

WICKWIRE SPENCER STEEL COMPANY

General Offices: 41 East 42nd Street, New York City; Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Portland, Seattle. Export Sales Department: New York City



Again LAPLANT-CHOATE Helps You Cut Costs with the CARRIMOR Rear Dumping SCRAPERS

Featuring

- **Simplicity**
- **Adaptability**
- **Mobility**

DIG, haul, dump or spread all materials on faster schedules with the new LaPlant-Choate CARRIMOR Rear-Dumping Scraper. Enjoy full capacity performance under conditions where ordinary scrapers cannot operate. Scientifically designed to reduce loading resistance . . . built to get in and out of tight spots easily . . . the LaPlant-Choate CARRIMOR makes extra profits for you because it assures more work . . . done the quickest, money-saving way.

Thanks to CARRIMOR'S advanced rear-dumping design, you can unload material exactly where you want it placed. CARRIMOR may be backed up for dumping over the edge of a fill; turned in close quarters; and gives perfect results for unloading either in a compact pile or an evenly-spread layer.

Famous LaPlant-Choate finger-tip hydraulic control provides positive down pressure to make the CARRIMOR dig hard material that would ordinarily require a preliminary ripping operation. Bell-shaped flared bowl design scientifically reduces loading resistance and assures clean dumping even of sticky material. Low center of gravity permits capacity digging and hauling on side angles that would cause an ordinary scraper to tip over.

Get the extra profits made possible by CARRIMOR'S ability to go places and do jobs impossible with conventional type scrapers. Harvest year-after-year savings from the low upkeep costs made possible by the ruggedness and simplicity of CARRIMOR design. Available in three sizes, and built exclusively for use with "Caterpillar" Track-type tractors. Get full details from your nearest LaPlant-Choate and "Caterpillar" dealer today.

Get consistently large payloads like the one shown in the upper picture, with a CARRIMOR Hydraulic Scraper. Note the large tires that give sure footing in soft ground. The lower picture illustrates the ease with which the CARRIMOR may be backed to the edge of a fill and dumped clean, exactly where desired. Put a mobile, efficient CARRIMOR on your jobs NOW!

TAMPING ROLLERS
BULLDOZERS • TRAILBUILDERS

LA PLANT-CHOATE MANUFACTURING CO. Inc.
CEDAR RAPIDS, IOWA.

RUBBER WHEELED WAGONS
BRUSH CUTTERS • SNOW PLOWS

we've *added* still

GREATER RANGE

. . . of operation to the *best* POWER CONTROL UNIT ever built

Here's the "brains" of your tractor tool operation — as well as the brawn. We don't mean to cast reflections on the "catskinner". Contrarily, he knows best what it means to have a powerful, trouble-free LeTourneau Power Control Unit work *with* him . . . his production shows up better.

When he angles his outfit he's *sure* the lower deck of *fair-lead* sheaves are automatically going to keep the cable aligned straight to the equipment. When he winds in more cable all his attention is on doing *his* job right — the upper deck of self-reeving sheaves *spool* the cable evenly on the drum . . . with never a thought to cable distortion. It's *always* protected from "piling" or rubbing on stationary parts, — *all ways*. Grooved steel sheave wheels prevent flattening, for they give *three-way* cable support — bottom and two sides.

One thing he doesn't know — yet: *interchangeable* line speeds are available in the new standard LeTourneau Power Control Unit — the Model "T". It requires changing only *two gears* in the detachable "neck" assembly. Remove a few case bolts . . . make a quick change . . . and *again* it's a perfectly engineered unit for the line speed that best suits his job demand. Reduction ratios range from 7.9:1 to 38:1 . . . with all speeds in between available. Entirely new in power unit construction are the herringbone gears in this "neck". They're quieter and smoother in operation, with one-third greater tooth strength (see inset).

Adding further to smoother operation is a *roller-bearing* mounted throw-arm on an automatic positive brake assembly. A flick of the control lever to neutral . . . and a vise-like grip is applied evenly to the drum. Yes, all the "chatter" is gone, which means long lining life. Thirty roller bearings — one at *every* bearing point — throughout the LeTourneau Model "T" Power Control Unit steady its operation to clock-like precision.

With all this, not a pound of weight has been added. Why, it's lighter than "units" that are merely winches and offer none of these advantages . . . for LeTourneau Power Control Units are *all-steel*, with case-hardened gears. More expensive — by far — to build, but you won't find it on the price tag.

Tractors thus equipped give a new versatility — for the same Power Control Unit operates any LeTourneau hauling, digging or lifting tool. Your "Caterpillar" and LeTourneau dealer will show you and your men right on your job what money-saving operation really means. R. G. LeTOURNEAU, INC., Peoria, Ill., Stockton, Calif.

LETOURNEAU

POWER CONTROL UNITS

to operate CARRYALL* SCRAPERS, ANGLE-DOZERS*, BULLDOZERS, ROOTERS*, BUGGIES*, DRAG SCRAPERS, PUSHDOZERS, CRANES, TREE-DOZERS.

*Name Reg. U. S. Pat. Off.

REPEAT ORDERS from leading contractors aren't made with SALES TALK!

THEY CAN RESULT ONLY FROM SATISFACTION IN SERVICE AND PROFIT IN OPERATION

Chicago, Ill. 3
D. TURECAMO CONST. CO. 7
Meadows, N. J. 5
CANE CONST. CORP. Meriden, Conn. 6
FRAZEE DAVIS CONST. CO. St. Louis, Mo. 13
GENERAL CONST. CO. Seattle, Wash. 4
GRACE CONST. & SUPPLY CO. Ft. Wayne, Indiana 7
W. A. BECHTEL CO. San Francisco, Calif. 4
C. J. LIST CONST. CO. Kansas City, Mo. 8
MERRITT-CHAPMAN & SCOTT CORP. New York, N. Y. 11
BASICH BROS. CONST. CO. Los Angeles, California 9
WINSTON BROTHERS CO. Minneapolis, Minn. 4
UTAH CONSTRUCTION CO. Ogden, Utah 6
A. GUTHRIE & CO., INC. St. Paul, Minnesota 8
GRIFFITH CO. Los Angeles, California 10
WILLIAMS BROTHERS INC. Tulsa, Oklahoma 6
ROHL CONNOLLY CO. Los Angeles, California 19
WALSH CONSTRUCTION CO. Davenport, Iowa 9
MORRISON-KNUDSEN CO. Boise, Idaho 9
GEO. W. CONDON CO. Omaha, Nebraska

GASOLINE • ELECTRIC • DIESEL • OIL

Built in a range of 18 SIZES ⅜ yd. capacity and Larger

One out of every 3 Northwests sold is a repeat order by a responsible contractor. One-third of the Northwests sold are endorsements of Northwest speed and output.

NORTHWEST

Shovels • Cranes • Draglines • Pullshovels • Skimmers

CONSISTENT SPEED

every day in the year

Athey Forged-Trak 2-Way Dump Trailers work *consistently* and profitably throughout the year. That cuts down investment in hauling units and keeps experienced workers busy in all seasons.

Fast, clean, positive dumping, either to right or left . . . you don't have to carry part of the load back from the dump. Ice chunks and slippery ground have no effect on the broad tracks of Athey units.

No delays in hauling or dumping during wet spring weather. Athey units roll right over loader spill . . . don't mire in the excavation . . . soft fills do not hinder their efficient operation. You get *consistent* speed.

Big loads won't "hang" in the wide body of an Athey 2-Way Dump Trailer. Substantial fold-down gates open fully when body is raised 18° . . . 55° is the full dumping angle. Rocks won't puncture the tracks of Athey units.

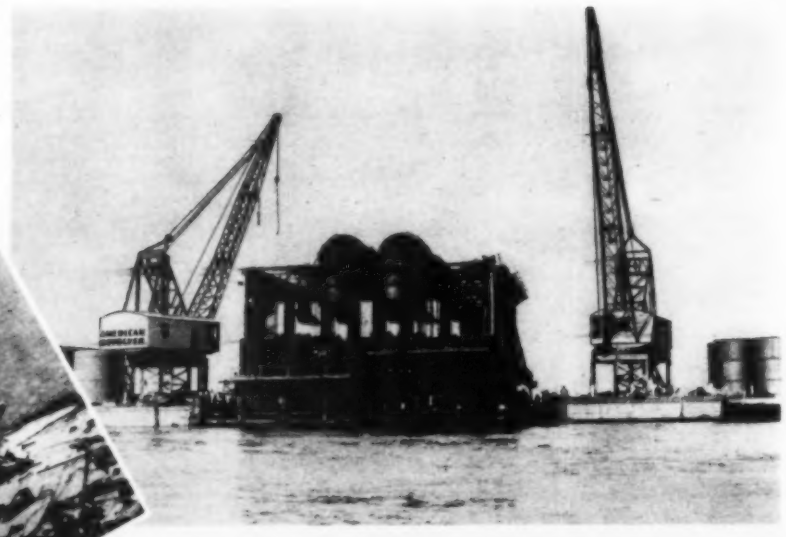
From body-top to wheel-tread, Athey Forged-Trak 2-Way Dump Trailers are built to cope with "nature in the raw." See your "Caterpillar" dealer or write us!

ATHEY TRUSS WHEEL CO., 5631 West 65th Street, CHICAGO, ILL.
Cable Address: "Trusswheel," Chicago

SEE YOUR "CATERPILLAR" DEALER

ATHEY

FORGED-TRAK 2-WAY DUMP TRAILERS



AMERICAN REVOLVER

A VERSATILE LARGE VOLUME MATERIAL HANDLER

The AMERICAN REVOLVER is a broad gage, full revolving, all steel live boom traveler. It is so versatile, adaptable and mobile that it will fit into practically any plant layout and simplify handling problems that had appeared extremely difficult. If your material handling problem has you stumped you are invited to make use of our advisory service. The AMERICAN REVOLVER in some one of its four sizes and many adaptations has been a life-saver in numerous difficult situations.

Catalog R-1. Write Department CM for

AMERICAN HOIST & DERRICK CO.
SAINT PAUL, MINNESOTA

AMERICAN TERRY DERRICK COMPANY
SOUTH KEARNY, N. J.
Branch Offices NEW YORK - - CHICAGO

A MONEY-SAVING SERVICE FOR ANY TYPE OF FLEET

Part of the equipment which enables Standard Oil Automotive Engineers to check fleet engines thoroughly for the slightest inefficiencies, to help you locate wasteful units and bring them up to standard. Ask your Standard Automotive Engineer to demonstrate on one of your own units just what can be done with these scientific instruments and the modern methods of trouble-shooting. He'll be glad to show you.

● IN MODERN, well-equipped bus maintenance departments—in temporary shops on construction projects—in the trucks and on the road with long distance haulers—you'll find Standard Oil Automotive Engineers searching out new ways to help beat down fleet operating costs.

These Engineers are equipped to analyze almost every fleet operating problem. Gasoline economy is only one item. Bus operators report fewer pull-ins, truckers tell about more power on the hills, contractors say they get greater yardage when a Standard Automotive Engineer is on the job.

Put one of the men to work for you. You can reach him through your local Standard Oil (Indiana) office, or by writing Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago, Illinois.

HELPS TRUCKER SOLVE LOW OIL PRESSURE PROBLEM

Chicago Dubuque Motor Transport Co. was having trouble with oil pressure on some of its trucks. Pressure could not be maintained even though an unusually heavy oil was used. A Standard Automotive Engineer rode one of these trucks for two nights, checking water and crank case temperatures, oil pressure, etc. When his report was analyzed, the real cause of the trouble was found to be a mechanical defect in the engines, and not the oil.

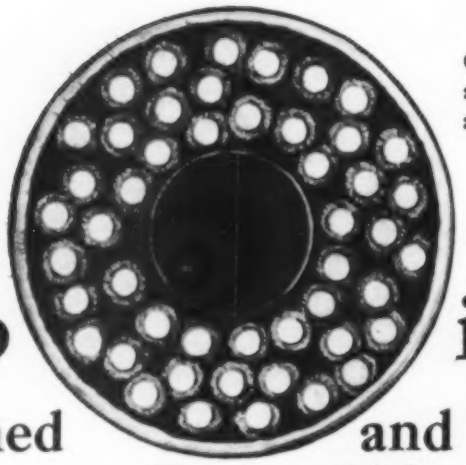
MORE POWER FOR COUNTY HIGHWAY EQUIPMENT

Tractors, graders and dump trucks in an Iowa County fleet had to be out on the road and on the job daily, but that did not stump the Standard Automotive Engineer. He was right on the job with them—taking advantage of any opportunity to check an idle unit—making his tests under actual operating conditions to insure getting full power in the engines, as well as gasoline economy.

Savings up to 25% in gasoline have been made by Standard Automotive Engineers on this type of equipment.

Instruments such as the pyrometer and thermocouples shown in the illustration *(left)*, help Standard Automotive Engineers locate the real causes of oil failure and combustion trouble.

STANDARD OIL COMPANY (INDIANA)



Cross section showing accordion fold wires around detonator.

The Cap is in the Middle

Cushioned and Protected on Every Side

The ATLAS Accordion Fold Electric Blasting Cap

48 folds of wire form a resilient cushion against shock for the Atlas Accordion Fold Electric Blasting Cap! The cap is in the middle—completely surrounded by leg wires at both ends and on all sides—an exclusive Atlas feature.

To keep this protection effective, the heavy paper tube holds the wires securely in place. Moreover—the Atlas Accordion Fold is the last word in compactness and convenience as well as safety. It is handy to carry—easy to open. Cap end is easily straightened out for priming without disturbing the rest of the accordion fold.

Ask the Atlas representative to show you these features of the Atlas Accordion Fold Electric Blasting Cap.

Photograph of package interior with wires pulled aside to show how completely cap is cushioned on all sides.

ATLAS POWDER COMPANY, WILMINGTON, DEL.

Cable Address—Atpowco

Everything for Blasting

OFFICES

Allentown, Pa.	Houghton, Mich.	Memphis, Tenn.	Pittsburg, Kansas	Seattle, Wash.
Boston, Mass.	Joplin, Mo.	New Orleans, La.	Pittsburgh, Pa.	Spokane, Wash.
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Chicago, Ill.	Knoxville, Tenn.	Philadelphia, Pa.	Salt Lake City, Utah	Tamaqua, Pa.
Denver, Colo.	Los Angeles, Calif.	Picher, Okla.	San Francisco, Calif.	Wilkes-Barre, Pa.

ATLAS EXPLOSIVES

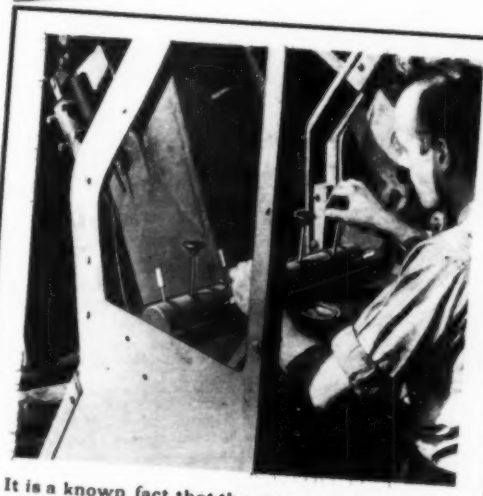
CHEMICALS ATLAS EXPLOSIVES

Speed-o-Matic

SHOVEL - DRAGLINE - CRANE

Yardage Costs Reduced

ON THIS UNUSUALLY TOUGH JOB !



It is a known fact that the operator's physical capacity limits the yardage handled per day, not the mechanical capacity of the machine. Time studies prove that Speed-o-Matic enables the operator to get 25% or more yardage than from the same size machine with manual-lever control.

● When a shovel takes over a tough job and increases yardage-output and reduces cost, such as this K-45 Speed-o-Matic did for A. J. Leaf Co., Utica, N.Y., it deserves the immediate and serious attention of every contractor. It dug into red shale rock and packed-cemented-gravel—swinging and dumping to 8-yd trucks—with a truck loaded every 39 seconds. Such performance is not unusual — it's the kind of performance Speed-o-Matic makes possible anywhere. Its speed, its flexibility and its ability to eliminate "operator fatigue" are all important advantages to help cut costs on any job. Send for catalog.

LINK-BELT COMPANY

300 West Pershing Road Chicago Distributors and Offices in Principal Cities 7708-A

LINK-BELT

FROM THE DAILY REPORT OF A
TIGER BRAND WIRE ROPE ENGINEER
"You're just the man I'm looking for," says the foreman when I walked in here this morning. He has been keeping service records on wire rope, and lately, performance has been falling off. He wanted to know whether he should try a new construction or a new grade.
"How long since you've regrooved those sheaves?" I asked. Nobody even remembered when they had been last regrooved!
Sure enough, that's where the trouble lay. The grooves had worn down so that the proper size gage nowhere near bottomed. Also they were badly scored. Now they're regrooving, and I'll bet you a hat the rope will last twice as long.
Yours,
al

— HOW LONG SINCE YOU'VE REGROOVED THAT SHEAVE?

TO get maximum rope life on your equipment, be sure to check grooves in sheaves and drums at regular intervals for size, contour, and depth. Such inspections are especially important when new wire ropes are to be installed.

Sheaves, drums, and wire ropes are moving parts, subject to wear. Rope travel causes groove wear. Consequently, as rope diameter decreases, grooves become deeper and narrower. Putting a new full-diameter rope in worn grooves causes a binding action that invariably deforms the rope, and cuts short its useful life.

Groove contours should also be inspected periodically for uneven wear, a condition which causes vibration, noisy operation, and generally poor service.

Whenever you find sheaves and drums which show evidence of excessive or uneven wear, regroove them. It will pay you big dividends in longer rope life and all-round better operation. Don't let worn grooves rob you of the performance you can expect from good wire rope.

USS
EXCELLAY
Preformed
WIRE ROPE

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
COLUMBIA STEEL COMPANY
San Francisco
United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

1939

A MARION YEAR FROM COAST TO COAST

More and more each year contractors are recognizing in Marion shovels, draglines, cranes, clamshells and pull shovels the many advantages they need to pile up profitable yardage. That is why many prominent contractors . . . who have never bought Marions before . . . are continually switching to Marions today. Let us send you a list of new Marion owners in your vicinity so you can investigate their outstanding performance records. » »

THE MARION STEAM SHOVEL COMPANY
Marion, Ohio, U. S. A.

Modernize WITH

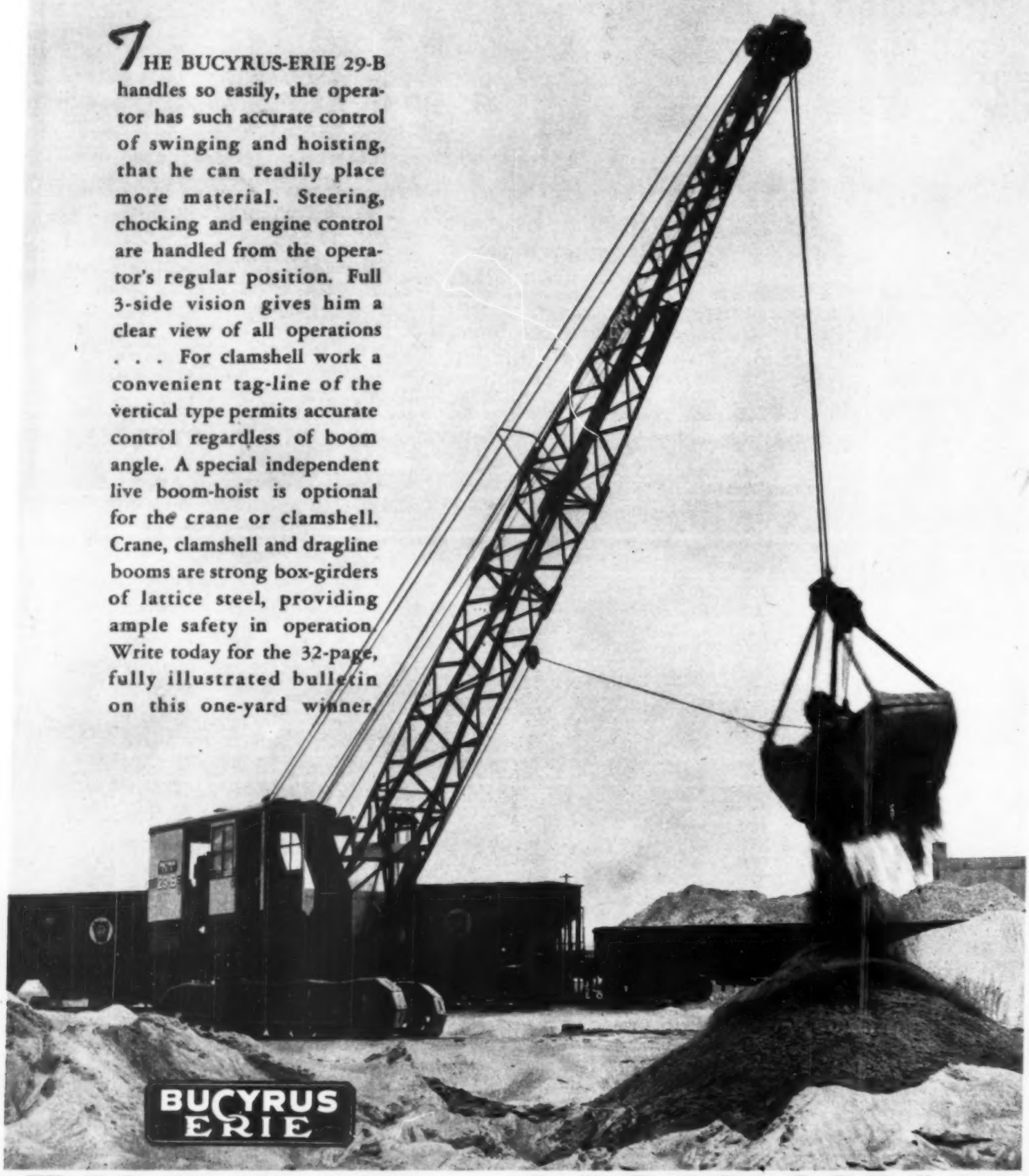
MARION

SHOVELS • CRANES • DRAGLINES • CLAMSHELLS
PULL SHOVELS •

Write for Bulletins describing the size of Marion in which you are particularly interested . . . also for a copy of the latest GROUNDHOG

ACCURATE CONTROL —for fast, profitable clamshell work

THE BUCYRUS-ERIE 29-B handles so easily, the operator has such accurate control of swinging and hoisting, that he can readily place more material. Steering, chocking and engine control are handled from the operator's regular position. Full 3-side vision gives him a clear view of all operations . . . For clamshell work a convenient tag-line of the vertical type permits accurate control regardless of boom angle. A special independent live boom-hoist is optional for the crane or clamshell. Crane, clamshell and dragline booms are strong box-girders of lattice steel, providing ample safety in operation. Write today for the 32-page, fully illustrated bulletin on this one-yard winner.



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Sold by: BUCYRUS-ERIE CO., SOUTH MILWAUKEE, WISCONSIN, U. S. A.

GET INTO THE PROFIT CLASS

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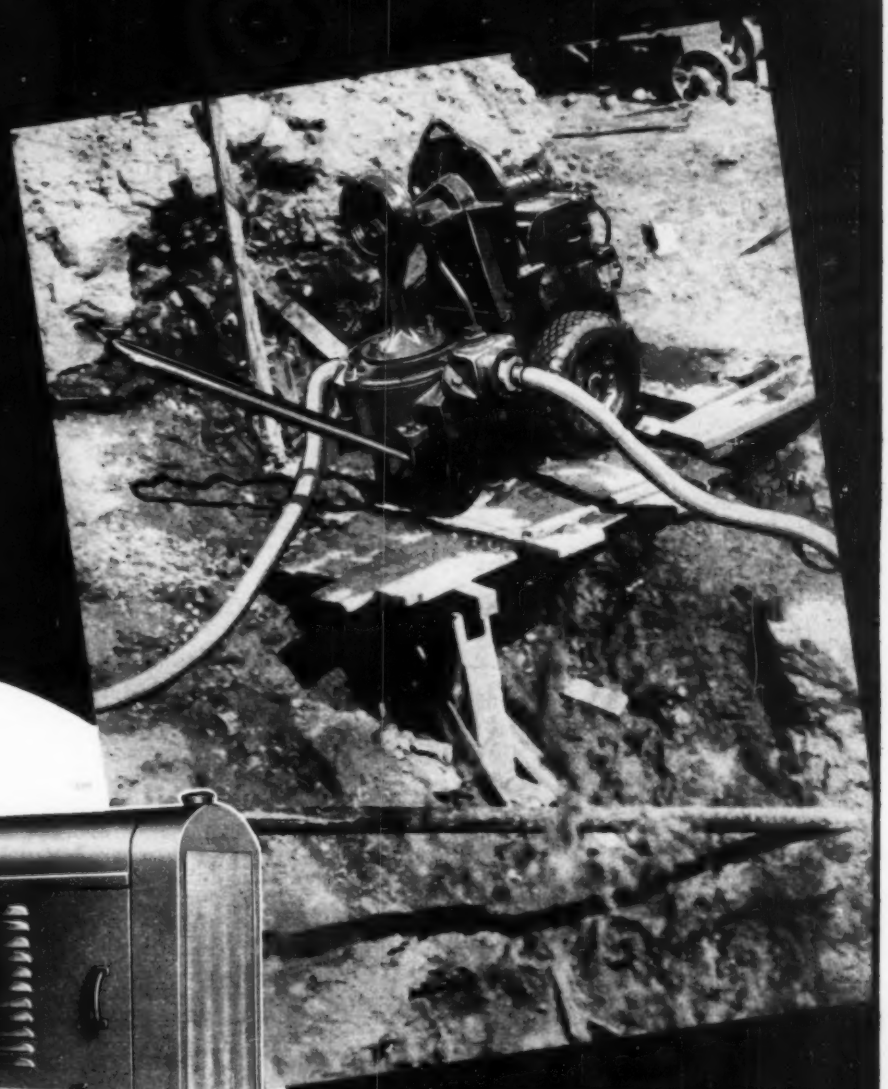
NOVO PUMPS

Whether it's on the *Highways of Tomorrow* or the *Construction of Today*, the new features incorporated in the Novo Pumps mean profits to you. They just can't miss and you can prove it to yourself.

Road Pumps—Diaphragm Pumps —Self-Priming Centrifugal Pumps— all meeting the A. G. C. Standards on every size.



NOVO ROAD PUMP

The greatest Road Pump Novo ever built. A powerful pump that has been designed to take the most gruelling service.

ECONOMICAL OPERATION is assured by the Novo Water Governor which has been proven to be an economy on operating costs and a saver of pump and pipe lines.

A. G. C. Standard Ratings are easily met by this pump and the lower price will surprise you.

THE NEW DIAPHRAGM PUMP

Did you ever see anything neater than that new Novo Lift and Force Diaphragm Pump above? That isn't half of the news about this easy - to - handle, big - capacity, utility pump.

You know the old, never-fail operation of the diaphragm pump on tough pumping jobs—thick muddy water, heavily laden with sand, gravel, and debris—large quantities of air with intermittent pumping. The new Novo Diaphragm eats these jobs up—besides, it has the enclosed gearing and close-coupled modern design.

Get the dope below.

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NOVO ENGINE CO., 214 Porter St., Lansing, Mich.

Please send full information on the

New Novo Road Pump .....

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RESEARCH IN LUBRICATION

has created an extra margin of safety in GULF PRODUCTS

This experimental equipment — designed and built in the Gulf Research Laboratory — is used to test bearing lubricants under a wider range of operating conditions than are encountered in actual service. Thus Gulf's field engineers are able to recommend lubricants for specific applications which not only meet the prevailing conditions, but provide an *extra margin of operating safety.*

GULF TECHNOLOGISTS *test bearing oils under load and temperature conditions far more severe than are encountered in actual service.*

WHAT changes take place in an oil under severe service? What is its rate of oxidation? What is the safest oil to use for a particular type of bearing? Answers to these and many other questions regarding lubricants are being accurately determined each day in Gulf's modern research laboratory.

Special machines, designed and built expressly for this experimental work, not only duplicate the conditions under which oils must perform in service, but set up still more severe conditions in order to insure an extra margin of operating safety for the lubricant under test. Thus, the knowledge gained by many years of practical experience in lubricating machinery of all types can be supplemented with newly developed facts.

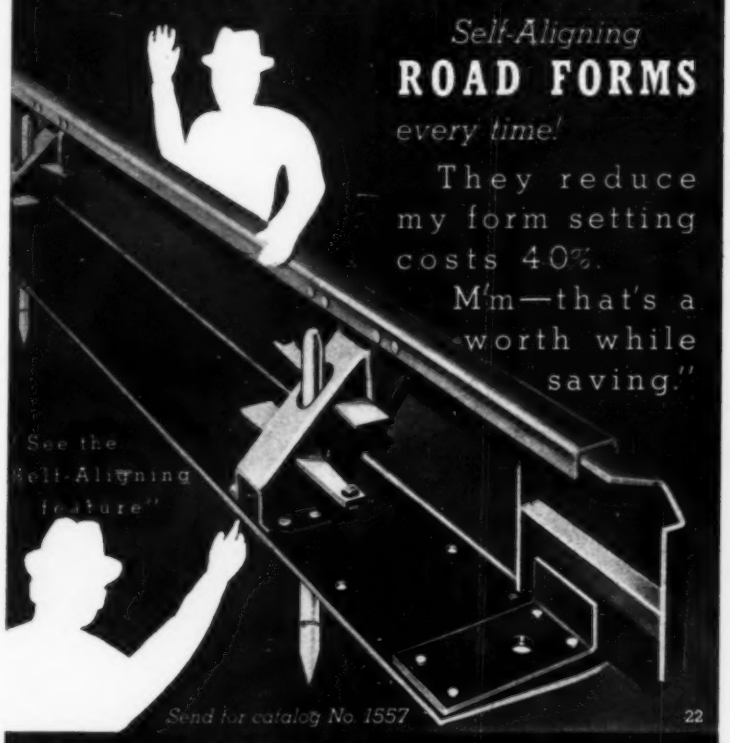
There is a Gulf quality lubricant which will insure minimum wear and long life for bearings and moving parts of your equipment. Ask the Gulf engineer who calls on you to recommend the oils and greases best suited to your needs. They are quickly available to you through more than 1100 Gulf warehouses in 28 states . . . Gulf Oil Corporation—Gulf Refining Company, Pittsburgh, Pennsylvania.

GULF INDUSTRIAL LUBRICATION

Also A COMPLETE LINE OF FUEL AND FURNACE OILS

"GIVE ME BLAW-KNOX *Self-Aligning* ROAD FORMS *every time!*

They reduce my form setting costs 40%. M'm—that's a worthwhile saving."



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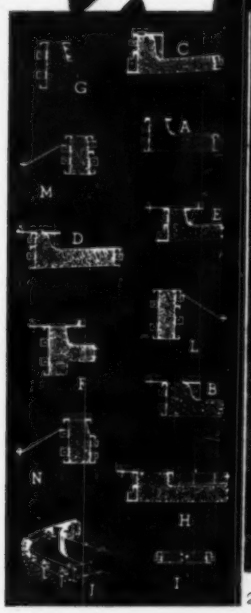
BLAW-KNOX BLAW-KNOX DIVISION OF BLAW-KNOX CO. Farmers Bank Bldg. Pittsburgh, Pa.

Self Aligning ROAD FORMS

"HOW DO I MAKE MONEY ON THESE SMALL JOBS?

Why—I have a set of BLAW-KNOX STEEL FORMS which will build most any cross section I bid on. Steel gives a nice, dense, smooth finish—expensive hand finishing unnecessary.

NATURALLY MY COSTS ARE LOW."



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Street and Sidewalk STEEL FORMS

"We're in this business to make money —and can do it with BLAW-KNOX TRUKMIXERS because they mix concrete faster and we get more trips per day"

It's a comfortable feeling to have truck mixers working for you that perform 100% under all conditions. No breakdowns— no time lost.

You make a *profitable investment* when you buy Blaw-Knox Trukmixers and agitators.

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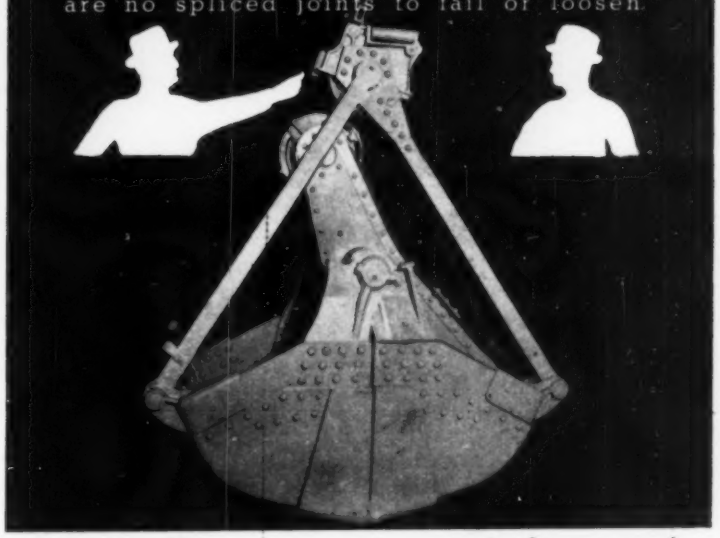
BLAW-KNOX BLAW-KNOX DIVISION OF BLAW-KNOX CO. Farmers Bank Bldg. Pittsburgh, Pa.

Agitators and TRUKMIXERS

"YES, that's the new Blaw-Knox Bucket Head Assembly—it's the strongest head I've ever seen—all FOUR corner bars are mounted on the head pin—there are no spliced joints to fail or loosen."



Progressive engineering and the use of approved materials make BLAW-KNOX the best buy in any kind of Clamshell Buckets.

Write for catalogs today

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Digging and Rehandling BUCKETS

LORAIN NO. 6 for DRAVO CORP.

• Here's the sixth Lorain purchased by the Dravo Corporation of Pittsburgh. It's a new 1½-yd. Lorain-79 shovel for their Mahoning Dam project near New Bethlehem, Pa.

Numbers speak louder than words—count machines on the tough jobs in '39 and you'll find the new 1½-yd. Lorain-79 is the contractor's choice *to move more material, faster, at lower cost.*

THE THEW SHOVEL COMPANY
LORAIN, OHIO

THEW CENTER DRIVE
REG U.S. PAT. OFF.

HERE'S WHY THE "79" IS '39's GREATEST SHOVEL AND CRANE VALUE

1 New 23-ft. all-welded shovel boom provides greater digging strength and ranges.

2 Double Center Drive turntable offers bigger hoist drums, more direct power, and greater speed.

3 Longer, wider, and heavier Center "Chain" Drive Crawler assures maximum stability and maneuverability.

Write for new Lorain-79 catalog describing these and many other features.

LORAIN 79

1½-YD. SHOVEL 25-TON CRANE

Established in 1919
A McGRAW-HILL PUBLICATION

Construction Methods and Equipment

ROBERT K. TOMLIN, Editor

Volume 21 | **April, 1939** | Number 4

Central Field Office Directs Large Housing Project Through LOUDSPEAKER SYSTEM

CONSTRUCTION BROADCASTER disseminates to entire job for use by particular crews. Announcer in field office keeps microphone busy relaying decisions and orders relating to numerous problems which crop up constantly.

LOUDSPEAKERS and telephone hand sets **(left)** strategically located on trees in 26-acre tract provide instant communication between central office and field crews on housing job.

CALLING CENTRAL OFFICE (below) for further details, field engineer uses telephone hand set attached to same tree in which one unit of loudspeaker system is mounted.

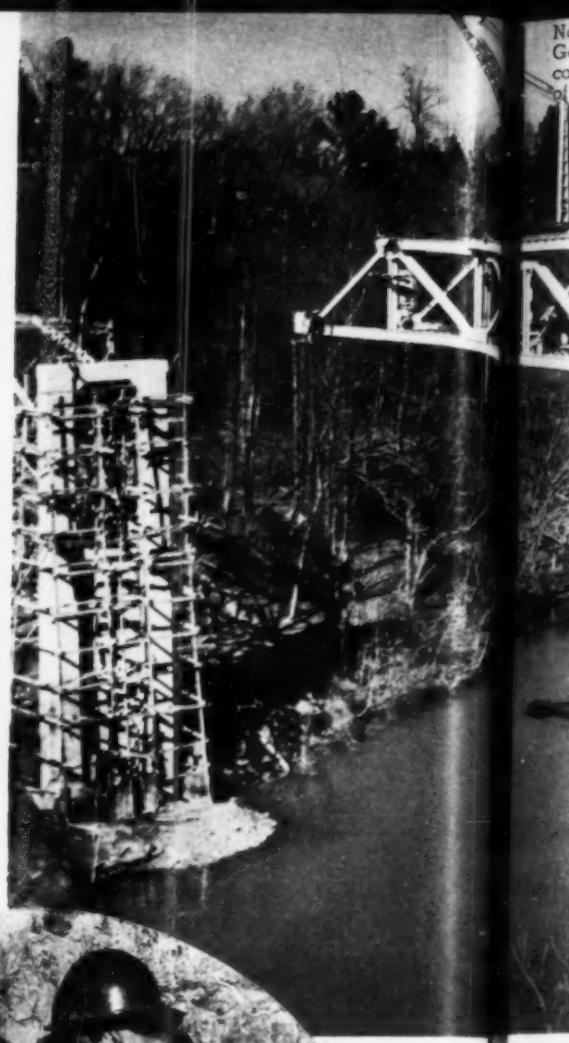
BROADCASTING ORDERS and instructions by talking into a central-office microphone connected to loudspeakers spotted in trees at advantageous points on a 26-acre tract, construction managers make quick contact with field supervisors and foremen directing work on Meadowbrook Village, $3,000,000 housing project being built at Plainfield, N. J., by Frank H. Taylor & Sons, Inc., East Orange, N. J. To obtain further clarification of any doubtful point, the field men telephone the office from a telephone hand set attached to the trunk of each tree in which a loudspeaker is located. Consultations thus are consummated at a great saving in time.

In the first section of Meadowbrook Village, the builders are erecting 31 two-story apartment houses. When completed, the community will comprise 50 buildings containing 400 apartments of 1,150 rooms. To provide direct communication with contractors, working crews, supervisors, inspectors, engineers and architects scattered over the job, the builders installed the network of amplifiers and telephones, some of them situated as far as ¼ mi. from the central office, which also serves as headquarters for representatives of the Federal Housing Administration, guarantor of mortgage money loaned by private agencies to the owner, Meadowbrook, Inc.

This Month's

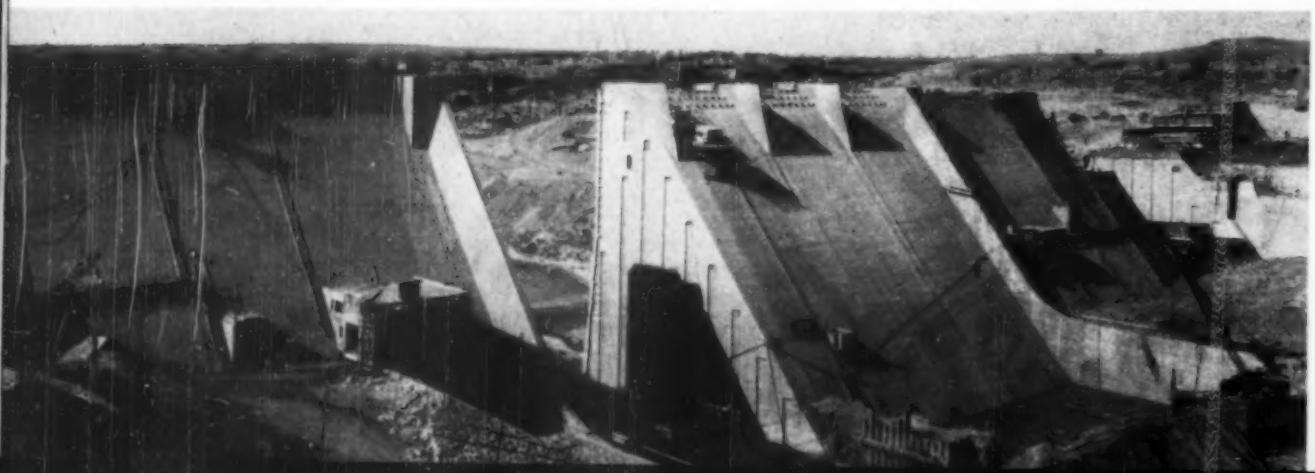
"NEWS REEL"

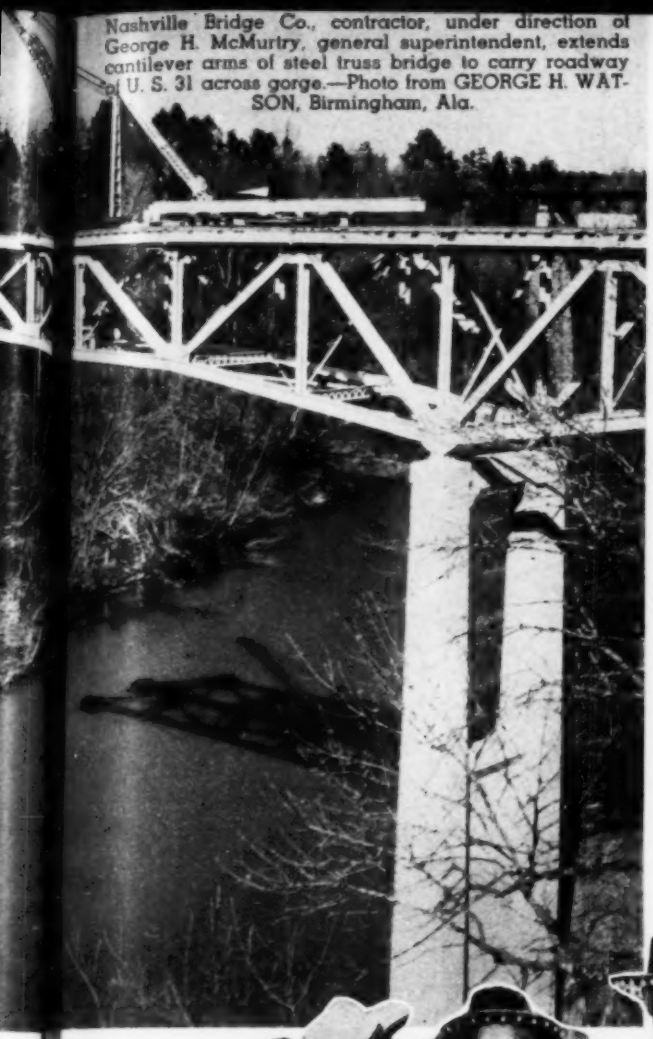
NEW $5,000,000 REFINERY for Richfield Oil Corp., at Watson, Calif., fabricated and erected by C. F. Braun & Co., Alhambra, Calif., is double combination unit for combined tapping and cracking, with capacity of 50,000 bbl. per day. Plant was largely shop-fabricated and shipped to site for field assembly by crew of 250 men. Provision for earthquake resistance is included in all structures. Erection of large bubble towers, weighing up to 140 tons, was handled by gallows-frame and three heavy-duty hoists. Outstanding safety record was made on this project; no lives were lost, and no serious accidents occurred.



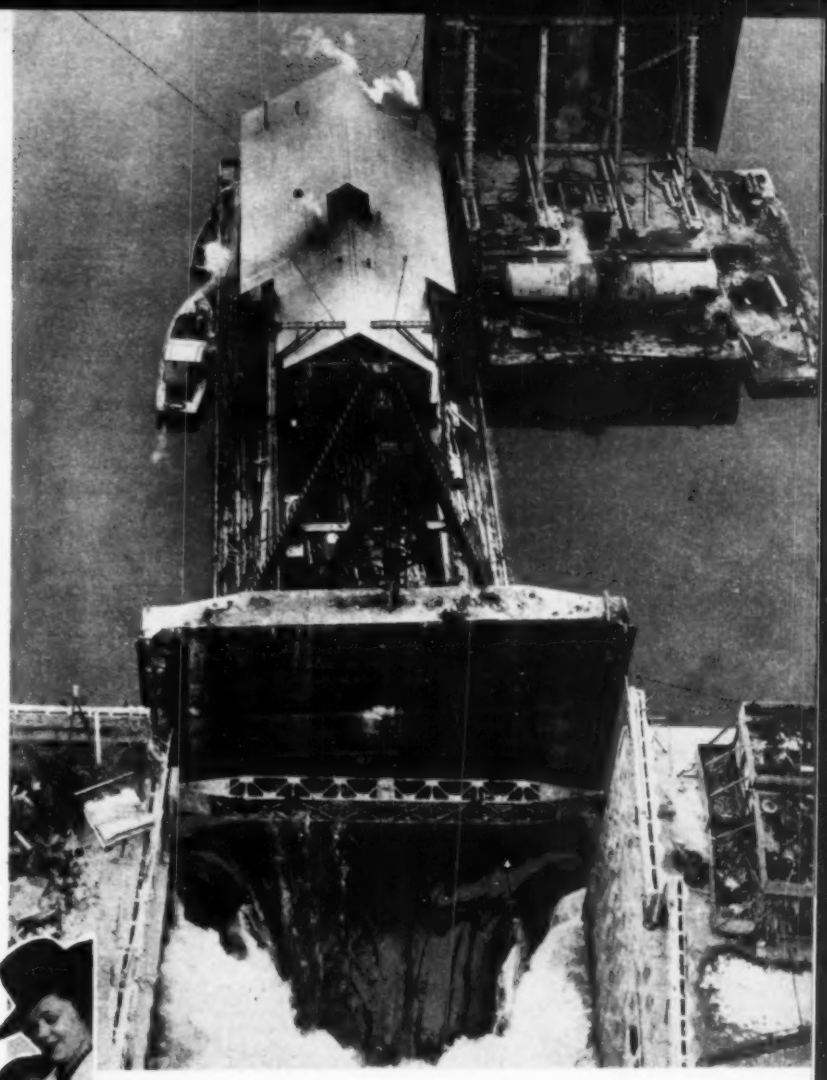
GOVERNOR'S INSPECTION of Conchas dam **(below)**, U. S. Engineer Department project in New Mexico, covers tunneling operations **(above)** at irrigation headworks under guidance of Capt. HANS KRAMER (third from left) district engineer. Party includes (left to right): Capt. W. D. Bridges, assistant to district engineer; W. E. Johnson; Captain Kramer; Gov. Clyde Tingley, of New Mexico. H. V. Pittman, inspection chief; A. E. Foote, superintendent for McCarthy Improvement Co.; V. F. Robertson; J. J. Rose, field engineer; and A. B. Needham.

SHASTA SHOOFLY TUNNEL breaks through early in March, permitting Colonial Construction Co., worker and U. S. Bureau of Reclamation inspector to shake hands in first hole between north and south headings of 1,820-ft. bore. After carrying Southern Pacific trains through dam abutment for 2 years, until permanent high-line relocation is completed, tunnel will pass Sacramento River diversion while Pacific Constructors, Inc., close temporary gap in Shasta dam.





Nashville Bridge Co., contractor, under direction of George H. McMurtry, general superintendent, extends cantilever arms of steel truss bridge to carry roadway of U. S. 31 across gorge.—Photo from GEORGE H. WATSON, Birmingham, Ala.



HUGE STEEL GATES (right) more than 50 ft. wide, weighing 75 tons each, handled on hoisting falls of floating derrick controlled by lines to upstream anchors, close diversion channels in Grand Coulee dam as Consolidated Builders, Inc., raise structure by stages toward final height, under direction of U. S. Bureau of Reclamation. Five 50-ft. channels pass winter flow, near its annual minimum. By midsummer, more than twice as many channels will be required, and each will carry much greater volume of water.

ROPED IN upon arrival at San Francisco for twentieth annual A.G.C. convention, E. P. PALMER, (left), New York City, retiring president, and GUY F. ATKINSON, San Francisco, new president, greet reception committee with mixed emotions.

MORE THAN 90 PER CENT COMPLETE on Feb. 23, New York World's Fair **(below)** rushes final touches in preparation for April 30 opening. Twin theme structures, Trylon and Perisphere, shining with painted stucco, dominate one end of Constitution Mall, which extends northeastward to Lagoon of Nations and Court of Peace, where Federal Government building is flanked by foreign pavilions. About one-third of Fair's 1,216½-acre area appears in this view, but buildings and exhibits in section shown probably represent more than one-third of $155,000,000 being spent on site.

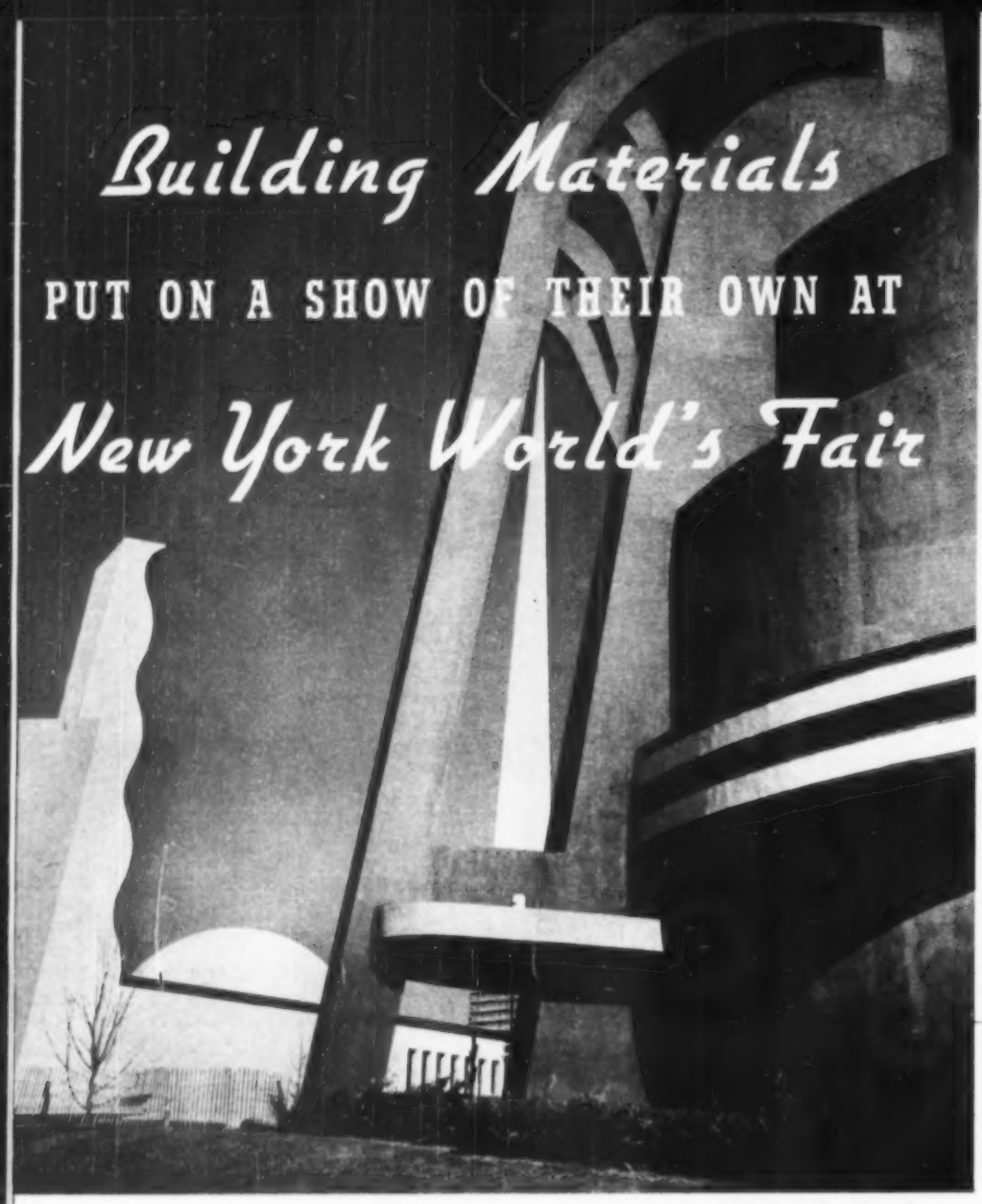
Standard Aerial Survey Photo

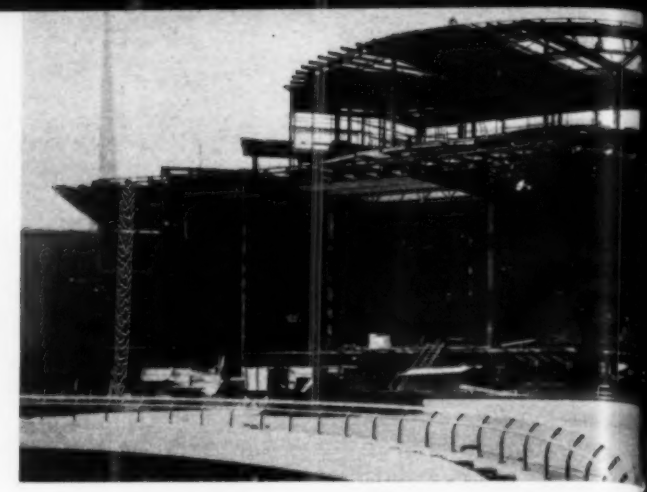
RELOCATING CALIFORNIA HIGHWAY and Santa Fe railroad tracks **(below)** around Prado Flood Control Basin near Corona, Calif., under contract awarded to Person & Hollingsworth Co., Los Angeles, and W. C. Cole, San Diego, for $241,000, constructors use Allis-Chalmers leaning-frame grader to finish tops of cut slopes.

Building Materials

PUT ON A SHOW OF THEIR OWN AT

New York World's Fair

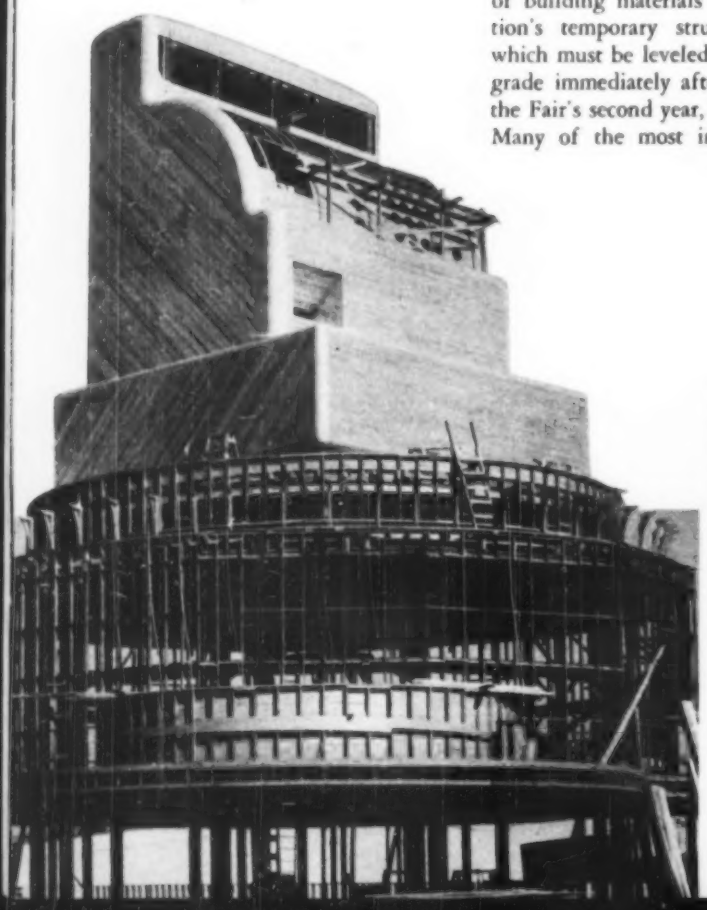




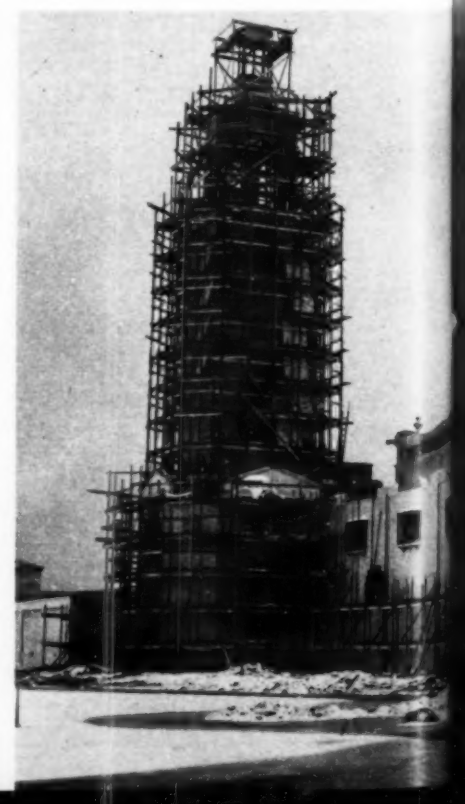
WHEN THE New York World's Fair opens its gates to the public April 30, the inquisitive construction visitor will find a wide range of applications of building materials in the exposition's temporary structures, all of which must be leveled to 4 ft. below grade immediately after the close of the Fair's second year, Oct. 31, 1940. Many of the most interesting construction details will be visible and practically self-explanatory to the trained observer, but others will be hidden from view either in whole or in part. Accompanying photographs show a few of the varied structural forms which deserve attention. An earlier article in *Construction Methods and Equipment*, Aug., 1938, pp. 36-43, sketched the Fair's building code requirements and illustrated the principal types of foundations and superstructures.

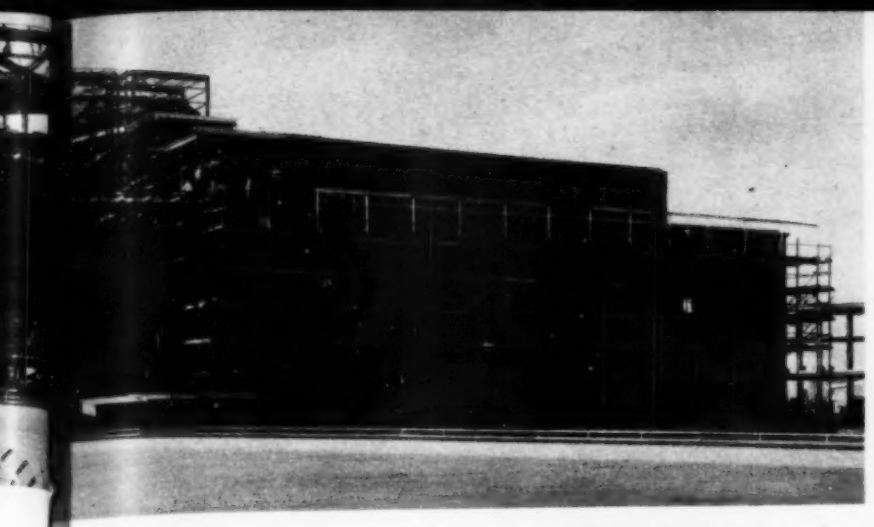
Of a total of $155,000,000 spent at the 1,216½-acre site in Flushing Meadow Park by the Fair Corporation, by domestic and foreign governments, by private exhibitors and by concessionaires, it is safe to say that $70,000,000 has gone into materials, labor and architectural and engineering services for construction. Incidental outlying works completed by the city, state and federal governments to take care of Fair traffic by air and highway represent an additional aggregate cost of more than $45,000,000, practically all of it expended for construction.

An accompanying table gives engineering estimates of materials used in construction projects of the Fair proper. On Jan. 15, the work was 90 per

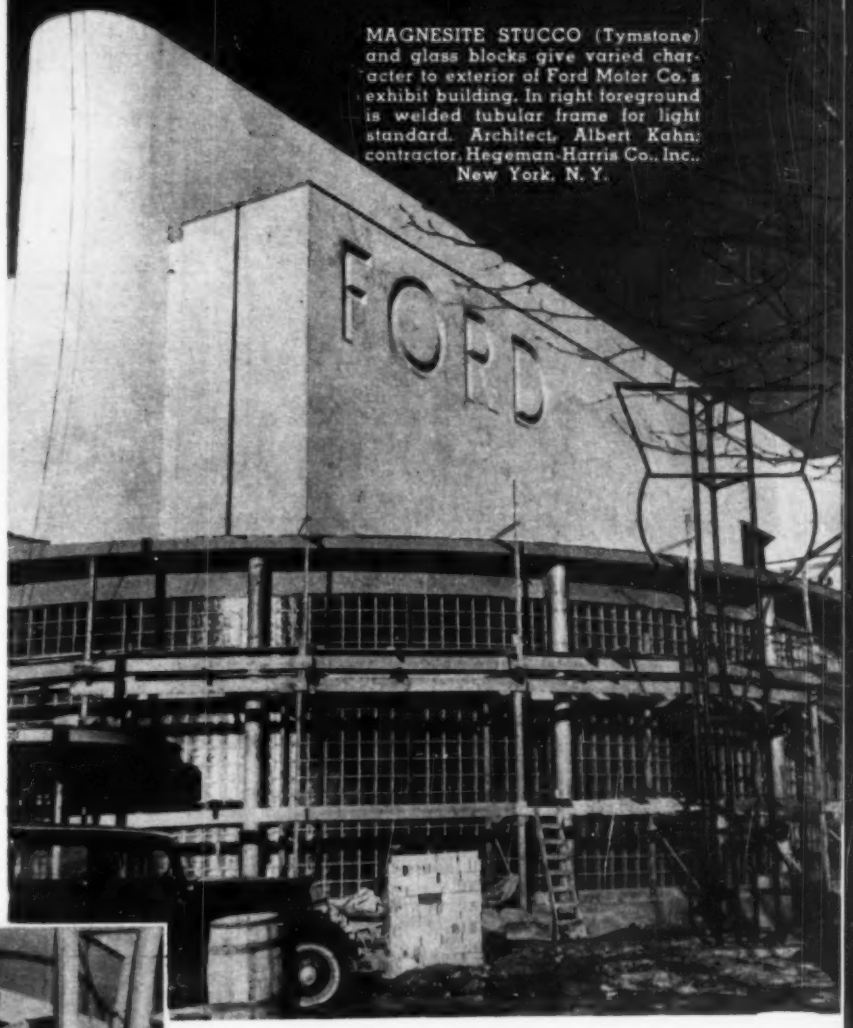


YOUR NUMBER, if you visit Fair, will appear on huge cash register **(left),** 40½ ft. high, atop National Cash Register exhibit building, slowly revolving on turntable and indicating daily and annual attendance as visitors enter Fair gates. Sheathing of t.&g. flooring is covered by ⅜-in. Armstrong monocork wall surfacing on 1-in. chickenwire mesh, stapled at 6-in. centers, used as reinforcement to take care of turntable vibration and to bridge gaps where boards may shrink. Cork wall covering is troweled on in two coats made with rubber latex and gray binding powder, using granulated cork in first rough coat and powdered cork in second finish coat. Wall then is painted with four brush coats of duPont paints: two coats of rubber-base paint and two coats of metallic aluminum paint. Architects, Landefeld & Hatch; contractor, William L. Crow Construction Co., New York, N. Y.





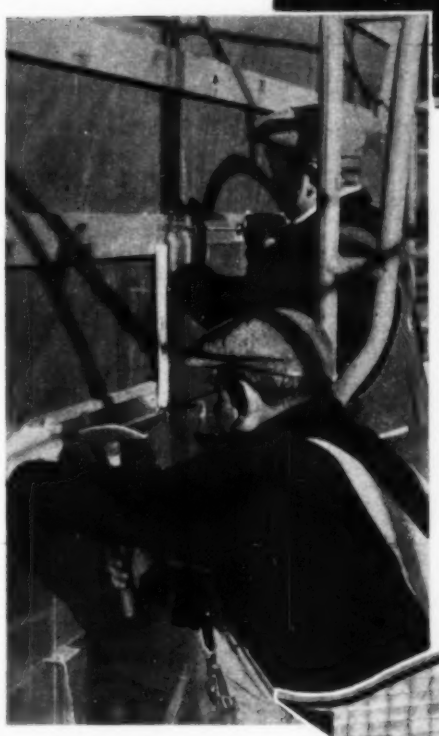
COMPLETELY FIREPROOF from top to bottom, French Pavilion, with restaurant on top floor, is only temporary building in Fair area having safety requirements which put entire structure in highest classification of Fair's building code. Keystone Fireproofing Corp., New York, under subcontract builds lightweight reinforced gypsum concrete floor **(left)** on ⅜-in. self-centering gypsum boards and, in addition, constructs large area of cinder concrete floor arches. Architects, Expert & Patou; contractor, James Stewart & Co., New York, N.Y.



MAGNESITE STUCCO (Tymstone) and glass blocks give varied character to exterior of Ford Motor Co.'s exhibit building. In right foreground is welded tubular frame for light standard. Architect, Albert Kahn; contractor, Hegeman-Harris Co., Inc., New York, N. Y.

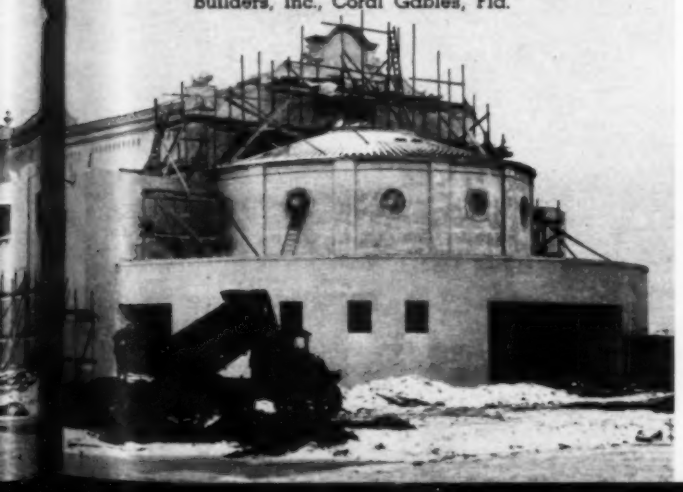
cent complete, and ample time remained to finish the final 10 per cent in advance of the opening date. During the winter months, as many as 8,400 workers were employed at the site, representing a daily payroll in excess of $75,000.

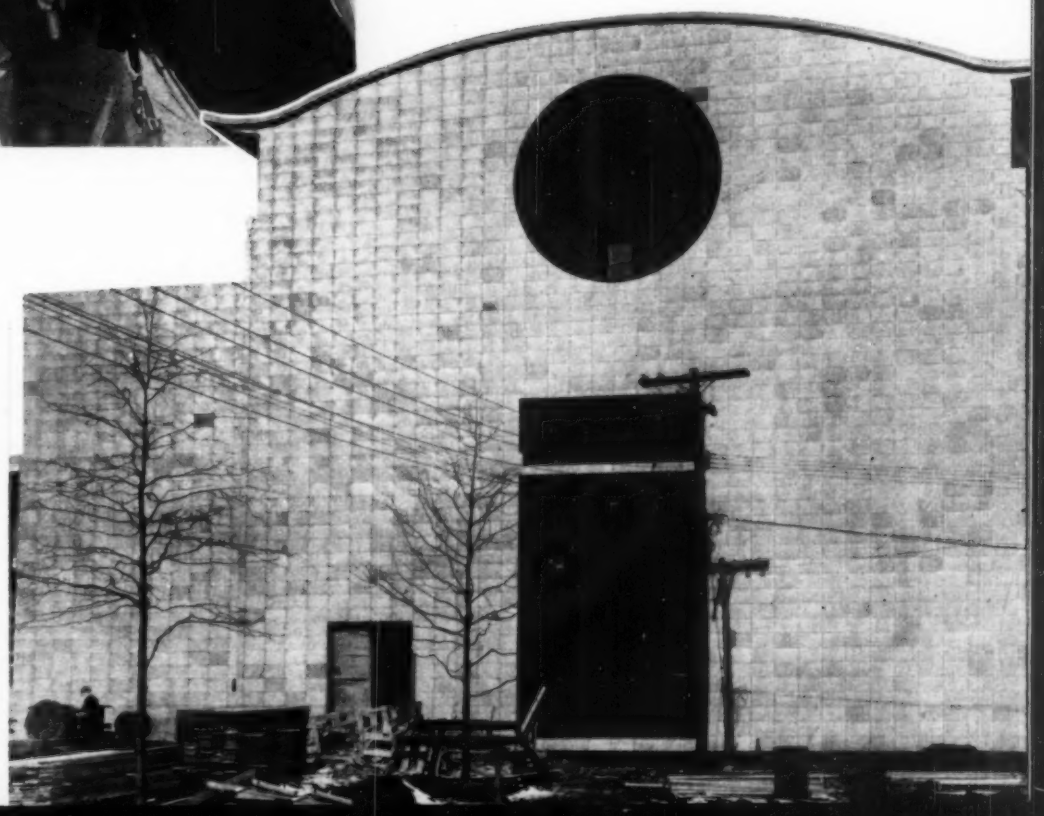
Grover Whalen, president, decides broad questions of policy for the New York World's Fair 1939, Inc. John P. Hogan, in his triple-threat position as vice-president-chief engineer-director of construction, governs the correlated functions of engineering and construction, including enforcement of the Fair's building code.



COPPER WALL PANELS for exterior facing of General Electric's Steinmetz Hall **(below)** consist of 24-oz. copper sheet (0.032 in. thick) in units having exposed surface area 15x24 in. (2½ sq.ft.), stiffened with filler of insulating fiber board, and weighing about 5 lb. each. Holes and pins accurately located in horizontal edges of Anaconda copper wall panels in factory maintain true vertical alignment in erection. **MECHANICS (left)** use gages to assure uniform horizontal joint spacing while driving holes for screws through upper copper flange with wood punch. Behind furring strips is thin copper membrane, with soldered joints between wide sheets, forming outer skin of two-layer electrostatic shield incorporated in building's entire shell. Architects, Voorhees, Walker, Foley & Smith; contractor, A. L. Hartridge Co., Inc., New York, N. Y.

FLORIDA CYPRESS SHEATHING of Burket 1 x 4 (by ¾)-in. boards, dovetailed in front face and sawkerfed in back to prevent warping, provides strong, stable bonding medium for direct application of Tymstone magnesite stucco on Florida building. For plastered interior walls, builders use Gall primer and paint to permit painting 1 day after plastering. Primer seals plaster, gives lasting adhesion and prevents alkalies from burning through to spoil colors; but as extra precaution contractor employs Granitex plaster, containing no lime, to produce smooth, hard wall surface which dries quickly. Architects, Paist & Steward; contractor, Deigaard & Preston Builders, Inc., Coral Gables, Fla.





ALL-WELDED LATTICEWORK TOWER (left and below) 141 ft. high and 32 ft. square, dominating Polish Pavilion, is continuous diagonal pattern of 8-in. I-beams shop-welded by American Bridge Co. in 11 x 40-ft. sections which are field-welded into structure by J. K. Welding Co., Long Island City, N. Y. To simplify bending for rounded tower corners, of 3½-ft. radius, corner members are built-up 8-in. steel-plate I-section. Face of tower is decorated with continuous intersecting circles made up of stamped Anaconda bronze Muntz metal panels which fit into diagonal tower openings, with stamped bronze rosettes at centers of circles, where diagonals intersect. Architect, Jan Cybulski,-Cross & Cross, associate architects; designing engineer, A. D. Stark; contractor, George A. Fuller Co., New York, N. Y.

ALUMINUM-CLAD CORRUGATED SHEETS of Robertson Protected Metal, consisting of steel core covered with successive layers of water-, acid- and heat-resisting materials, wrapped in final coat of aluminum foil, give gleaming, streamlined appearance to long arched structure forming part of Aviation building. V-beam-section sheets, used on this building both for architectural effect and for load-carrying capacity, are bolted directly to girts and purlins supported by three-hinged steel arches of main frame. Architects, William Lescaze and J. G. Carr; contractor, William L. Crow Construction Co., New York, N. Y.

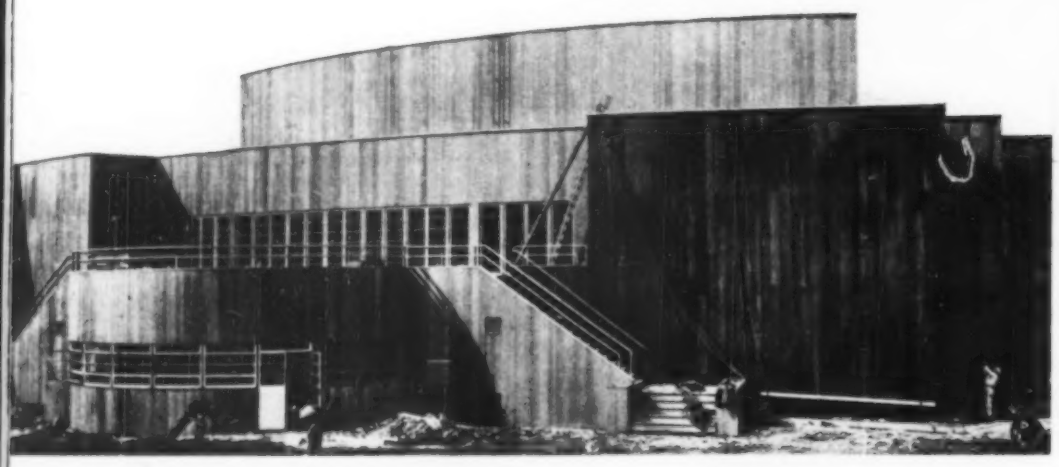
New York World's Fair

(Continued)

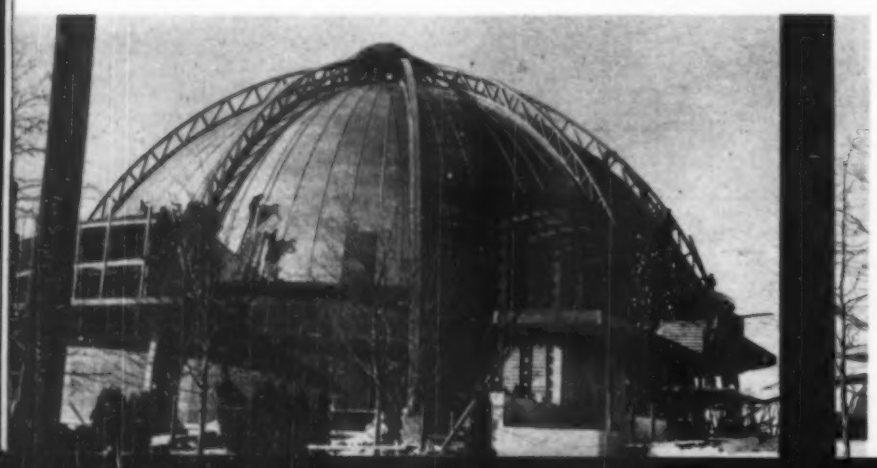
SOME ROUND-FIGURE ESTIMATES OF CONSTRUCTION ITEMS NEW YORK WORLD'S FAIR

These figures are minimum, and the quantities in general do not include projects sponsored by federal, foreign and state governments, by various industries and by concessionaires.

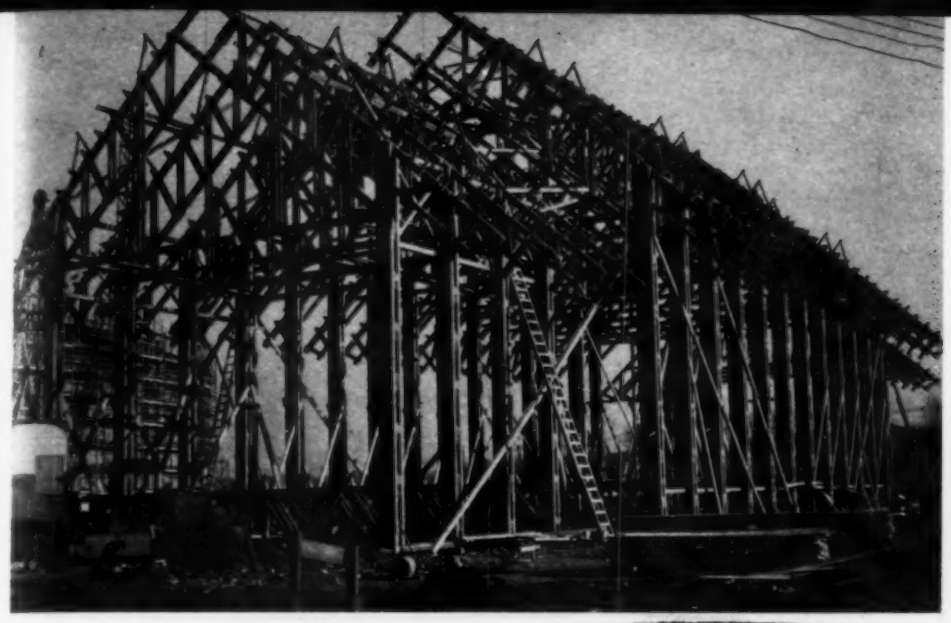
Earth moved in grading site	7,000,000 cu. yd.
Area covered by buildings	3,000,000 sq. ft.
Wall area of buildings	15,000,000 sq. ft.
Roads	17 mi.
Walks	34 mi.
Storm sewers	20.5 mi.
Sanitary sewers	10 mi.
Water mains	15 mi.
Gas mains	13 mi.
Electrical ducts	15 mi.
Piling	758 mi.
Lumber	30,000,000 b.-ft.
Steel	39,250 tons
Sand, gravel, crushed rock	130,000 tons
Cement	19,900 tons
Pipe (steel, iron, tile)	16,500 tons
Wall board	22,500,000 sq. ft.
Metal lath	8,500 tons
Masonry materials — tile, brick, etc.	2,000 tons
Roofing	9,000 tons
Flooring	16,000 tons
Paint	200 tons
Paving materials	207,000 tons
Lighting equipment	9,000 tons
Mechanical and hydraulic equipment	6,200 tons
Landscaping material — trees, hedges, fertilizer, etc	31,200 tons
Miscellaneous materials	30,000 tons
Exhibits	100,000 tons
Perisphere, weight	9,200,000 lb.
Trylon, weight	4,300,000 lb.



SANDBLASTED REDWOOD SIDING, applied vertically on top of gypsum sheathing and coated with colorless stain and waterproofing, provides novel texture in exterior facing of Contemporary Arts building. Sand blasting eats away softer portions of grain and creates rough surface which reflects light from all angles. Designers chose redwood because of its interesting color and texture and because it can be obtained in almost any size board, has long life and is subject to minimum shrinkage and twisting. Boards measure at least 28 ft. long and vary in width, thickness and finish, depending upon location. Architects, F. L. Ackerman, J. D. Lowenfish and John Van Pelt; contractor, John W. Ryan Co., New York, N. Y.

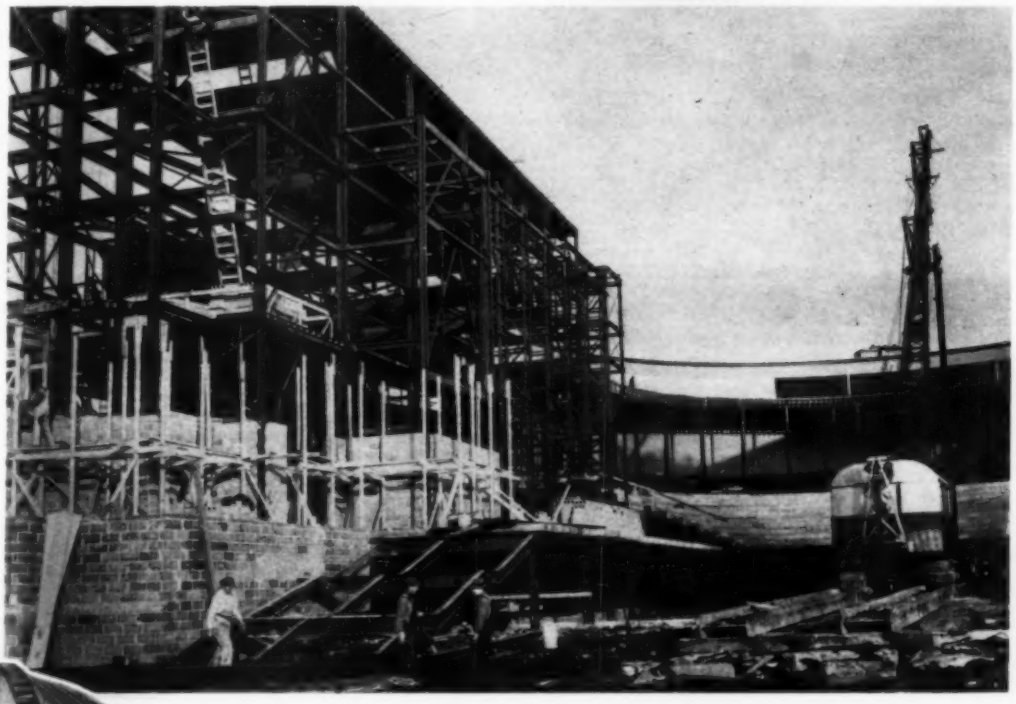


INVERTED DESIGN (left), with supporting trusses exposed on exterior of dome-shaped shell, distinguishes U. S. Steel building, to which workmen are applying stainless steel sheets of outer surface over building paper. Architects, York & Sawyer; contractor, George A. Fuller Co., New York.



MASSIVE TIMBER FRAME furnishes structural skeleton for Japanese Pavilion, duplicating Shinto temple with American materials. Complete bents, designed by Roof Structures, Inc., New York, N. Y., and framed with Teco split-ring connectors, are fabricated on ground, one upon another, and are raised into vertical position. Twelve large bents and eight smaller bents contain about 80,000 b.-ft. of Douglas fir. Floor goes on top of timber-truss ties connecting bent columns at bottom. Architect, Y. Utiza,-Yasuo Matsui, associate architect; contractor, Parklap Construction Corp., New York, N. Y.

WATERPROOFING COMPOUND is sprayed with DeVilbiss equipment **(left)** between two layers of Gyplap sheathing on 3-acre surface of 200-ft.-diameter Perisphere, surrounded by vast network of tubular steel scaffolding erected by Chesebro-Whitman Co., Inc., Long Island City, N. Y. Second layer of gypsum sheathing is covered with Tymstone magnesite stucco on burlap, and surface is given one brush coat of off-white rubber-base paint. Architects, Harrison & Fouilhoux; contractor, Graves-Quinn Corp., New York, N. Y.



CLOSURE WALLS (left) of cinder concrete block and terra cotta tile provide backing for 800 tons of Russian marble and porphyry, cut here and applied to Soviet Pavilion in accordance with practice followed by foreign participants using imported materials. Pavilion is of permanent construction to permit possible re-erection on another site. Lima 50-ton crane **(left and below)** of Harris Structural Steel Co., equipped with synchronized counterweight (Construction Methods and Equipment, April, 1937, pp. 52-53), has 170-ft. boom, later lengthened to 190 ft. by adding piece of steel column to erect top members of steel tower 180 ft. high. Architects, Boris M. Iofan and Karo S. Alabian,-Pomerance & Breines, supervising architects; contractor, Hegeman-Harris Co., Inc., New York, N. Y.

IT LOOKS LIKE BRICK, but it isn't brick. After more than 1 year's exposure of samples at its testing laboratory, World's Fair Construction Department wrote specification for brick sheet to be used on buildings in Court of States, where Ohio is completing graceful Georgian design **(left).** World's Fair selected brick sheet for this building from 45 samples, all meeting specification, manufactured and submitted by contractor. Material consists of gypsum board scored and colored to simulate brick. Some other contractors in Court of States use Stonetone brick sheets, of Timbertone-Stonetone Co., made of ½-in. ship-lap Sheetrock gypsum board painted with oil-cement-asbestos compound containing color pigment, waterproofed with three coats of colored waterproofing which shades brick in different tones, and, finally, scored with white mortar lines in deeply impressed brick joints. Architect, John P. Schooley, Ohio state architect and engineer; contractor, John W. Ryan Co., New York, N. Y.

Battery of Tall Derricks Places

250,000 YD. OF CONCRETE

In Dam and Power House

A BATTERY of six tall guy derricks and one stiff-leg, spotted at advantageous positions by the Rinehart & Dennis Co., Charlottesville, Va., contractor, on the dam and power house of the Appalachian Electric Power Co.'s Claytor hydro-electric development on the New River, 3 mi. upstream from Radford, Va., handles practically the entire quantity of 250,000 cu.yd. of concrete required by the project. From the mixing plant, equipped with two 2-yd. mixers, the concrete rides to the dam and power house in 2-yd. bottom-dump buckets on flat cars of a narrow-gage steam railway. Ordinarily the contractor plans operations to use at one time two derricks on a large pour and one derrick on a small pour to take care of an average plant output of 80 cu.yd. an hour. The equipment places a maximum of 1,000 cu.yd. in a day.

Dam and Power House—Construction of the dam and power house requires excavation of about 25,000 cu.yd. of earth and 18,000 cu.yd. of rock, in addition to the placing of 250,000 cu.yd. of concrete. Overall length of the dam is about 1,150 ft., and the maximum height from the bottom of the river to the spillway crest, at El. 1,818 above sea level, is 98 ft. Spillway openings are closed by vertical-lift steel gates 28½ ft. high, which will be regulated to maintain reservoir level of El. 1,846. Between the gates are gate piers 37 ft. high, carrying hoisting piers which rise 50 ft. above them.

In the power house will be installed four vertical-shaft turbines with a capacity of 26,000 hp. under a head of 118 ft., driving four 18,750 kw. generators. Excavation for the draft tubes under the turbines required a maximum cut of 23 ft. into rock.

Foundation rock under the power house and spillway sections of the dam is sound dolomite and limestone. At the two abutments, the dam ties into solid ridges of dolomite.

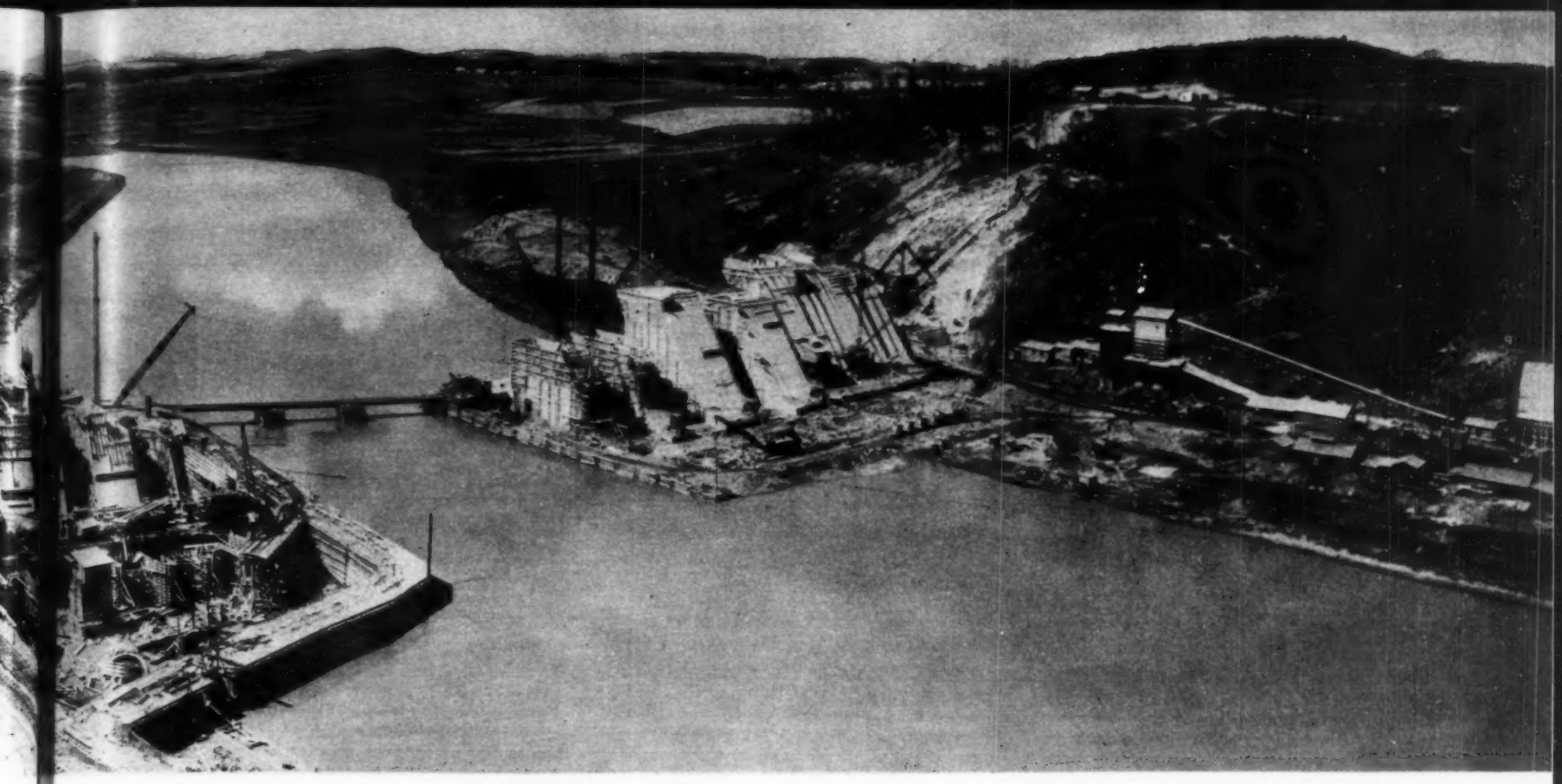
Three Cofferdams — Construction operations at the site were started several years ago by the power company when it strung a 3-ton cableway about 1,400 ft. long across the river, built the power-house cofferdam and began rock excavation for the foundations inside this coffer. The cofferdam was an earth-filled timber box constructed with Wakefield built-up plank piling.

Moving into the job on May 17, 1937, the Rinehart & Dennis Co. first built a railroad bridge across the river downstream from the dam connecting a quarry spur on the south bank with the construction plant site on the north bank. A second railroad bridge was extended from the plant site across the river to the power-house cofferdam. To permit foundation excavation for the north section of the dam, the contractor promptly started construction of a rock-filled timber-crib cofferdam, blanketed with clay, with the upstream and downstream lines tied into the river bank. As concrete was placed in this section of the dam, halves of three blocks were left open to pass the river when a third cofferdam would be constructed to close the channel between cofferdams 1 and 2.

Because the New River is a mountain stream subject to sudden floods at all seasons of the year, the dam builders had to be prepared for high water and flooded cofferdams at any time. Flash floods resulting from quick runoff of heavy rains are likely to occur in the summer and fall. It is uneconomical to build cofferdams to a height which will keep out all floods. Between May, 1937, and May, 1938, the power-house cofferdam was flooded once and the north cofferdam was flooded three times. The floods caused no damage to the coffers.

Before building the third cofferdam, closing the river and narrowing

OPENINGS IN NORTH SPILLWAY SECTION (below) pass river flow during construction of central portion of dam. Six guy derricks handle bulk of concrete for dam and power house. By Sept. 15, steel frame of power house superstructure is substantially complete.



SPOIL BANKS for excavated material extend along both banks of river upstream from dam. Track on upper level at left is used to transport wasted overburden from quarry downstream. Contractor locates mixing plant and shops on north bank and delivers concrete to power house across railroad bridge connecting upstream arms of cofferdams.

the floodway to the three openings in the north section of the dam, the contractor raised No. 1 cofferdam an additional 5 ft. and built the third coffer to this height. The upstream arm of the third cofferdam was a rock-filled timber crib, sheeted with planks and banked with clay on the water side. For the downstream arm, the contractor used similar construction but omitted the sheeting. Concreting of the dam foundation in the third cofferdam was started in May, 1938.

Concrete — A quarry and crushing plant on the site prepares all the coarse aggregate and sand from dolomite. The coarse aggregate in the mass concrete is in three sizes: ⅜ to ¾ in., ¾ to 1½ in. and 1½ to 3 in. The stone sand, or fine aggregate, grades from No. 4 square mesh to about 15 per cent passing a 100-mesh sieve.

Mass concrete employs 0.85 bbl. of cementitious material (289 lb. cement, 31 lb. hydraulic lime) per cubic yard. Average compressive strength of the concrete at 28 days is 3,400 lb. per square inch. The maximum water to cement ratio by weight is 0.75, and the gravel to sand ratio is about 1.8.

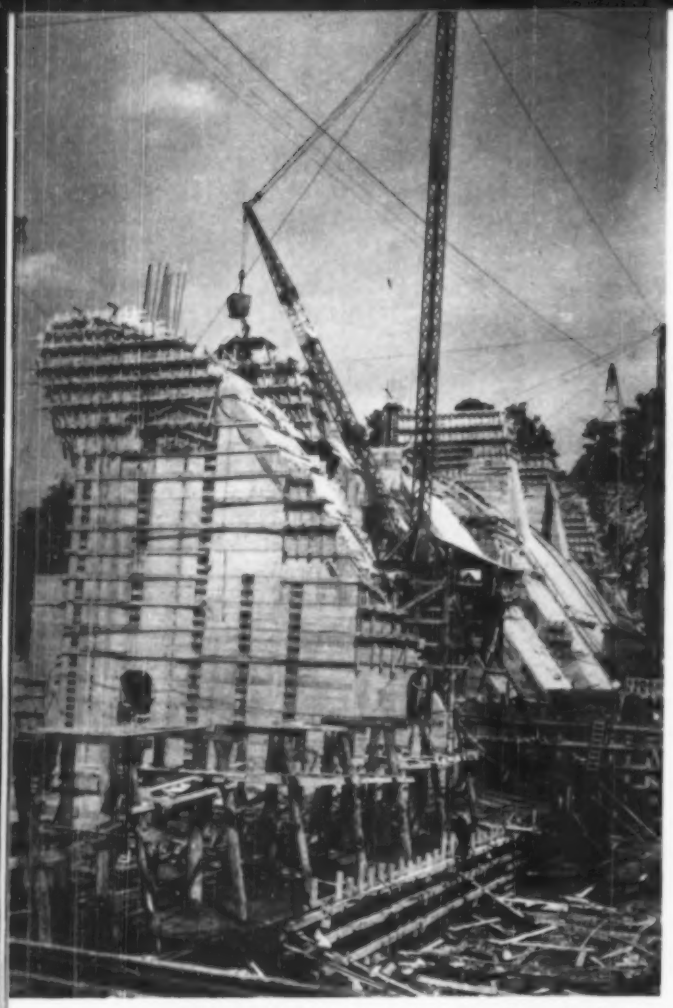
Face concrete employs 1.2 bbl. of cement per cubic yard. The water to cement ratio by weight is 0.57, and the gravel to sand is about 1.95.

Aggregate Supply — Rock is quarried from a dolomite ridge on the south side of the river about a mile downstream from the dam and is crushed and loaded into 30-yd. air-dump railroad cars. Trains of these cars are moved across the railroad bridge to the north side of the river and are pushed up a grade to a point near the concrete mixing plant, where the cars can side-dump their loads into sloping side-hill bins erected by the contractor. The bins feed through bottom gates on to a 30-in. belt conveyor, 400 ft. long between end pulleys, which elevates the aggregate to 200-ton overhead bins of the mixing plant.

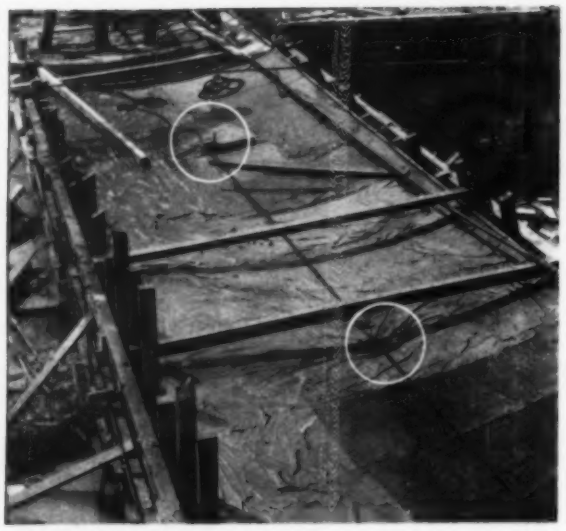
Bulk cement is delivered to the mixing plant in hopper-bottom railroad cars which discharge into a track hopper. A Redler continuous-flow flight conveyor transfers the cement

RAILROAD BRIDGE (below) connecting quarry on south bank with mixing plant on north bank has bolted timber piers resting on rock-filled wood-sheeted boxes which have solid bearings on rock bed of river.

QUICK RISES of mountain river flood cofferdams **(below)** at various seasons of year. This flood, in October, 1937, overtops No. 2 cofferdam and comes close to top of No. 1 cofferdam, inclosing power house.



GUY DERRICK hoists 2-yd. bottom-dump bucket into position for placing concrete in spillway gate pier.



WATER SPRINKLERS keep curing mats wet on apron of spillway section. Apron and baffle piers are sprinkled for 21 days; other portions of dam are kept wet for 7 days after concrete is placed.

SPIRAL-WELDED CONDUITS and forms for inspection tunnel are placed in hard rock bore excavated in dolomite at south abutment.

GAP IN SPILLWAY SECTION on north bank affords railway access to upstream face of dam.

from this hopper to the top of a 3,000-bbl. wood-stave storage silo, and a second flight conveyor delivers cement from the silo to a weighing batcher in the mixing plant.

Manually operated weigh-beam scales measure out the cement and four sizes of aggregate. As shown by a photograph, the scales are equipped with needle indicators to assist the operator in cutting off the flow of material at the proper point. The cement batcher is suspended in the center of the aggregate batcher to permit the cement to slide with the other dry ingredients into the mixer. Compressed air jets along the sides of the large batcher assist the fine aggregates in sliding.

Batches are mixed for 2 min. in the two 2-yd. tilting mixers, which discharge into concrete buckets on flat cars.

Railway—Seven 20-ton steam dinkeys handle excavated material and concrete on a 36-in. gage railway. For railway hauling, the job is equipped with twenty 5-yd. dump cars and 30 flat cars.

Derricks and Cranes — Equipment already on hand was utilized by the contractor in designing the job plant for handling concrete and for other operations. The tall guy and stiff-leg derricks which hoist concrete have given service on several similar projects in past years. They are operated by electric-motor-driven hoists which have been kept in excellent condition.

Hoist engines driving the six guy derricks (115-ft. mast and boom, 20-ton capacity) comprise five two-drum units and one three-drum unit, powered by 80-hp. electric motors. The stiff-leg derrick (90-ft. boom, 15-ton capacity) is operated by a 40-hp. two-drum electric hoist engine.

To handle excavation, the contractor had four steam shovels: two 1¾-yd. machines, one 1½-yd. unit, and one ⅞-yd. excavator. The three larger shovels have been equipped with crane booms to handle muck skips and to place concrete from 2-yd. and 1-yd. buckets. For these services the

WEIGH-SCALES (left) equipped with needle indicators meter aggregates and cement in mixing plant. Cement batcher is suspended in center of large aggregate batcher.

CORE DRILLS sink holes 90 to 150 ft. deep along upstream face of spillway section.

TWO 2-YD. TILTING MIXERS discharge mixed batches into bottom-dump concrete buckets on narrow-gage railway flat cars. Bulk cement drops from hopper-bottom railroad car, at left, into track hopper, from which it is elevated into storage silo by flight conveyor.

contractor has on the job twenty 1½-yd. steel skips, 24 2-yd. concrete buckets and twelve 1-yd. concrete buckets.

Compressed Air Equipment — Compressed air for the job is supplied by two short-belt-drive compressors, one with a capacity of 1,100 c.f.m., driven by a 200-hp. electric motor, and one of 888 c.f.m. capacity driven by a 150-hp. motor. Three small wagon outfits equipped with drifters drilled 30-ft. grout holes at 30-deg. angles crossing the limestone seams, using detachable bits on 18-, 24- and 30-ft. steel. For line-hole and blast-hole drilling in the foundation rock, the contractor used ten jackhammers.

All concrete is vibrated with air-driven vibrators. For this work, the job is equipped with nine vibrators, rigid-shaft and flexible-shaft types, in one- and two-man sizes. The rigid-shaft vibrators include three 6-in., one 5-in., and three 3-in. units. Two flexible-shaft vibrators have 3-in.-diameter vibrating elements.

Six air pumps serve to remove inflowing water from sumps. In addition to these pumps, the constructors make use of eight electrical centrifugal units, ranging in size from 2-in. to 8-in. A 10-in. electric well-type turbine pump, installed by the power company in the first cofferdam, is used when necessary to unwater the power-house area.

Shops — A blacksmith shop is equipped with two bolt- and pipe-threading machines. An oil furnace and a drill sharpener take care of the 1¼-in. hollow steel for the jackhammers. In the woodworking shop are three power saws: a band-saw, a cross-cut saw, and a rip saw.

Direction—Engineering design and general supervision of the project are by the Engineering Department of American Gas & Electric Service Corp., New York City. For the service corporation, Philip Sporn, vice-president in charge of engineering, directs both design and construction. At the Claytor development, H. S. Slocum is construction engineer in charge, and G. W. Hutchinson is concrete technician.

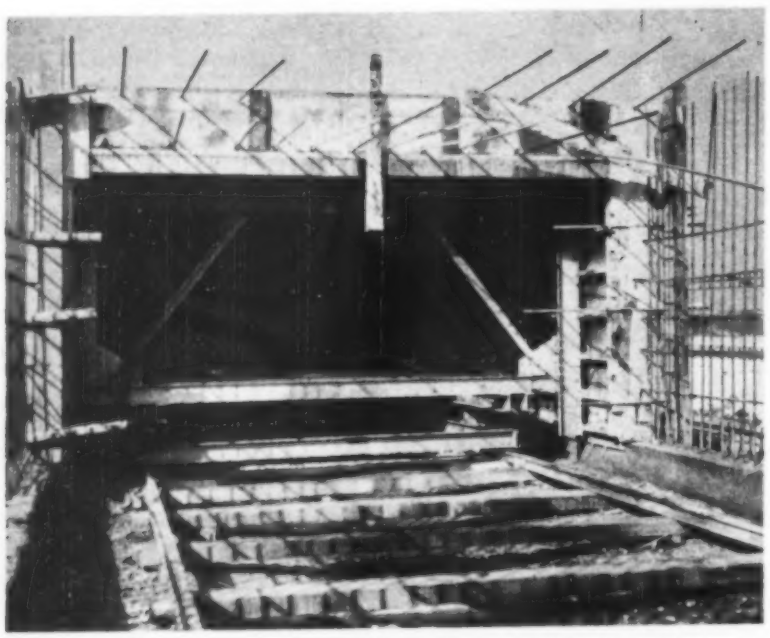
For the Rinehart & Dennis Co., Charlottesville, Va., contractor, H. D. Faulconer, general superintendent, and R. C. Perkins, superintendent, are in charge of construction work on the project. Officers of the contracting company are P. H. Faulconer, president, and E. J. Perkins, vice-president.

DIRECTING PROJECT for contractor and owner, respectively, are E. J. PERKINS (left), vice-president, Rinehart & Dennis Co., Inc. and H. S. SLOCUM, construction engineer in charge.

CONSTRUCTION OPERATIONS are directed for contractor by R. C. PERKINS (left), superintendent, and H. D. FAULCONER, general superintendent.

WAGON DRILLS (left) sink 30-ft. grout holes at 30-deg. angle crossing seams of limestone bedrock.

TYPICAL CONCRETING OPERATION utilizes two 1-yd. paving mixers on opposite banks of sheeted trench to chute concrete to heavily reinforced four-barrel sewer 66 ft. wide.



MOVABLE STEEL FORMS rolling on rails are used inside each of four barrels. In good weather, contractor utilizes four 80-ft. lengths of steel forms.

Twin Pavers and Traveling Forms

Speed Progress on

Four-Barrel Monolithic Sewer

TIMBER PILES (left) 45 to 58 ft. long, driven in transverse bents on 4-ft. centers, support sewer in soft muck sections.

OUTLET SECTION of sewer contains four 10 x 15-ft. barrels. JAMES A. DONOVAN, estimator, P. Tomasetti Contracting Co., stands on roof, and JOHN J. KAVANAGH, inspector of construction, Bureau of Sewers, Borough of Brooklyn, on invert.

IN SHEETED TRENCH excavated through swamp muck and drained by sump pumps, sewer builders construct reinforced-concrete storm drain 66 ft. wide containing four 10 x 15-ft. barrels. Only one mixer is stationed here at end of sheeted pocket. Top of invert in foreground is El.-8.

A FOUR-BARREL reinforced-concrete rectangular drain, one of the largest monolithic sewers ever built, is rapidly approaching completion in Brooklyn, N. Y., where the P. Tomasetti Contracting Co., of the same city, has employed two 27E mixers and four sets of steel forms 80 ft. long to construct as much as 240 ft. in one week under direction of the Bureau of Sewers. The new sewer connects with existing conduits, formerly emptying into a tidal slough at the north end of the contract, and extends them 2,000 ft. farther south toward Jamaica Bay in a four-barrel structure at bottom elevations 10 to 12 ft. below tide level. Construction has been carried on in an open trench sheeted with horizontal timbers between vertical H-beams and drained by sump pumps aided, where practicable, by well points. Each linear foot of sewer requires 11½ to 12 cu.yd. of concrete and 1 ton of reinforcing steel.

Sewer Dimensions — Included in the contract are three special chambers: a conformer section at the north end connecting with the existing drains, a separator chamber which diverts dry-weather flow of sanitary sewage to a 42-in. sanitary sewer, and an outlet chamber emptying storm-water into a tidal channel. Between the conformer section and the separator chamber is a 1,629-ft. stretch of sewer comprising four 9x15-ft. barrels equivalent in total cross-sectional area to a circular sewer of 21-ft. diameter. This section has outside dimensions 66 ft. 2 in. by 13 ft. and takes 11½ cu.yd. of concrete per running foot.

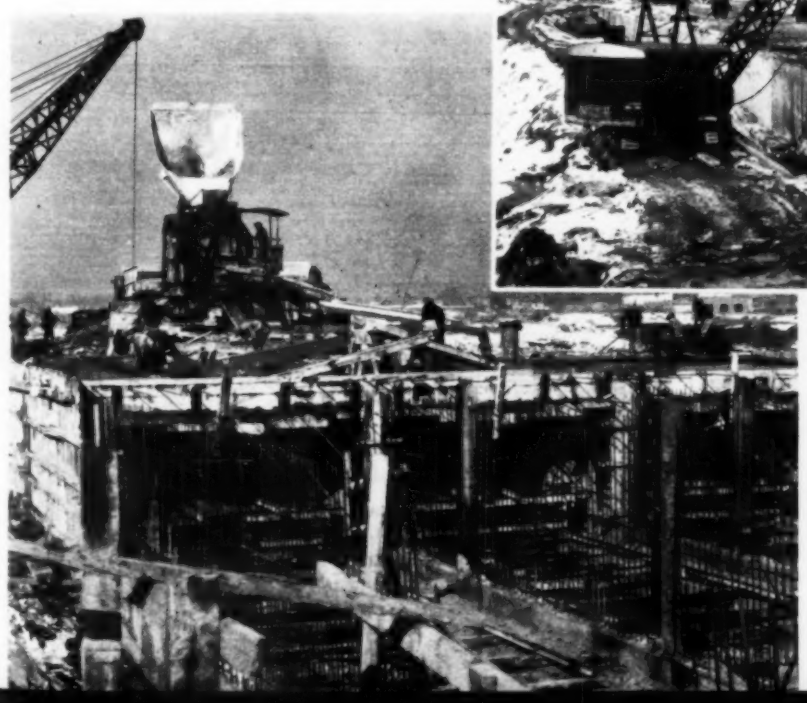
Tide gates to prevent tidewater from backing up in the sewer are installed in the separator chamber downstream from the trap for sanitary sewage. In a 207-ft. section between the separator chamber and the outlet chamber, the structure incloses four 10x15-ft. barrels equivalent to a 22½-ft. circular sewer. Overall dimensions are 66 ft. 2 in. by 14 ft., and the amount of concrete required is 12 cu.yd. per foot. At the separator and outlet chambers the sewer structure broadens to overall widths of 75 ft. or more. The roof of the sewer is 22 in. thick and the invert has a minimum thickness of 26 in., including tile lining. Wall thickness, including lining, is 16 in. for outside walls and 14 in. for inside walls.

Tile Lining — Sidewalls and invert of the four barrels are lined for the entire length of the sewer with salt-glazed vitrified clay tile liners, 9x18-in. size, set in mortar after the forms have been stripped. The lining requires 220,000 tile units.

Foundations — Except where the bottom of the trench was in soft muck, the sewer rests on natural soil. At the south end of the contract, in a section of meadow muck, the separator and outlet chambers and the intervening sewer are supported by timber pile bents on 4-ft. centers. A bent under a normal sewer section, 66 ft. 2 in. wide, comprises 17 piles. The bents are capped with 10x10-in. timbers covered with 4-in. planking. Piles range from 45 ft. to 58 ft. long and average about 50 ft. The entire job involves about 125,000 lin.ft. of piles.

Trench Drainage — For practical reasons related to ground conditions and economy, the contractor maintained the tidal slough roughly in its original location during construction of the new sewer. This channel lay on the east side of the new sewer for part of the distance below the outlet from the existing sewers and on the west side for the remainder of the distance. The contractor carried construction of the uniform 1,600-ft. stretch of sewer right through the

IN SHALLOW TRENCH, sewer is concreted in 40-ft. sections by paver supported above roof of completed structure. Forms beyond range of chutes are filled by concrete bucket on boom of crawler crane.



STEEL H-POSTS (left) concreted in two interior walls of sewer structure carry timber cribbing on which mixer rests.

SIDEWALLS AND INVERT of sewer barrels are lined throughout with salt-glazed vitrified clay tile. Brick lining is used around arched equalizer openings between barrels and at several other points in sewer.

point where the channel crossed from one side to the other. A crossover was maintained through the new structure by leaving openings in the walls and by building brick bulkheads shored with timber rakers inside the four barrels, until such time as the flow could be diverted into the new sewer and the slough could be filled.

In the north portion of the contract, where the soil contained some sand, the contractor operated Moretrench well points to relieve groundwater pressure in the trench. As excavation progressed toward the bay into impervious muck, the use of well points was discontinued. Three to four 10-in. sump pumps removed inflowing water from all sections of the trench. At no point did these pumps have to take care of a groundwater head of more than 2 ft.

Concrete Mixture — Single-batch trucks, loaded on the job, delivered sand and gravel for 1:2:4 concrete to the pavers. Cement was added at the mixer. Batches were mixed 2 to 3 min. in the drums.

Construction Procedure—A Koehring 27E paver and a Multi-Foote 27E, traveling on opposite banks of the trench, chuted concrete to invert an arch of the four-barrel structure. In good weather, the contractor used four 80-ft. lengths of Blaw-Knox traveling steel forms. The forms were

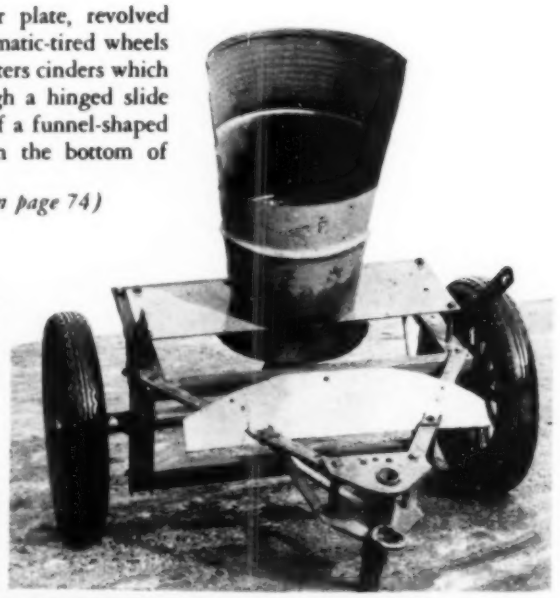
(Continued on page 64)

SHOP-BUILT CINDER SPREADER *Gives Fast Roadway Coverage*

A HOME-MADE CINDER SPREADER assembled from spare parts by a small maintenance shop under the direction of B. M. Chaplin, maintenance superintendent for the State Road Commission, Monongalia County, Morgantown, W. Va., covers a 20-ft. roadway uniformly at a speed of 8 to 10 mi. per hour with two men on the truck shoveling into the spreader hopper, in comparison with a speed of 4 to 5 mi. an hour for hand spreading. The spreader requires only half the amount of cinders ordinarily used in spreading by hand. After observing successful operation of his first home-made unit, Mr. Chaplin built additional spreaders for all patrol crews.

A discarded automobile rear axle which has a short jack shaft or universal joint on the drive shaft forms the basis of the mechanical spreader. The shaft is turned up in vertical position, and on top of it is bolted a 17-in.-diam. plate with four bolted vanes radiating from the center. Rotation of the circular plate, revolved by traction of pneumatic-tired wheels on the roadway, scatters cinders which are fed to it through a hinged slide gate at the mouth of a funnel-shaped discharge section in the bottom of

(Continued on page 74)



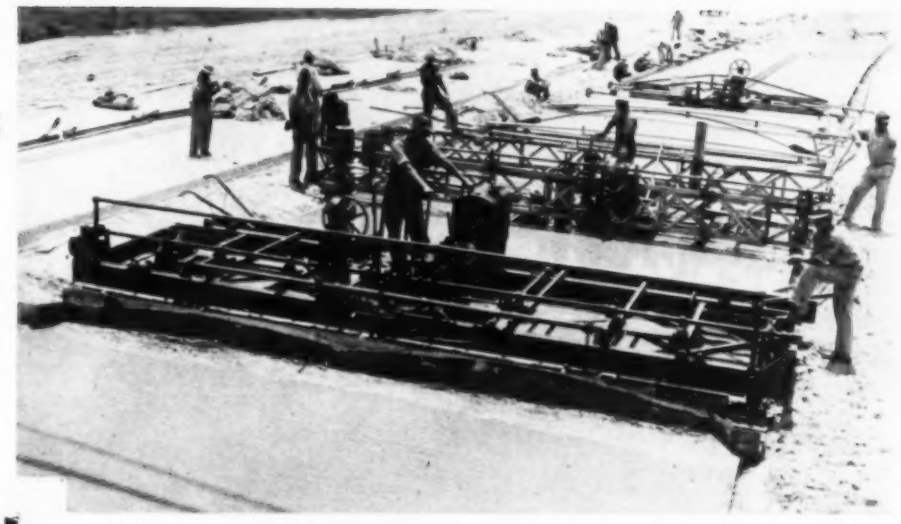
ADJUSTABLE HITCH (right) at front end of spreader can be adjusted to suit height of truck.

CINDER SPREADER (left) attached to rear of truck by tail-gate chains is raised clear of ground to carrying position when truck body is lowered.—Photos by B. M. CHAPLIN, maintenance superintendent, State Road Commission, Monongalia County, Morgantown, W. Va.

Specialized Machines

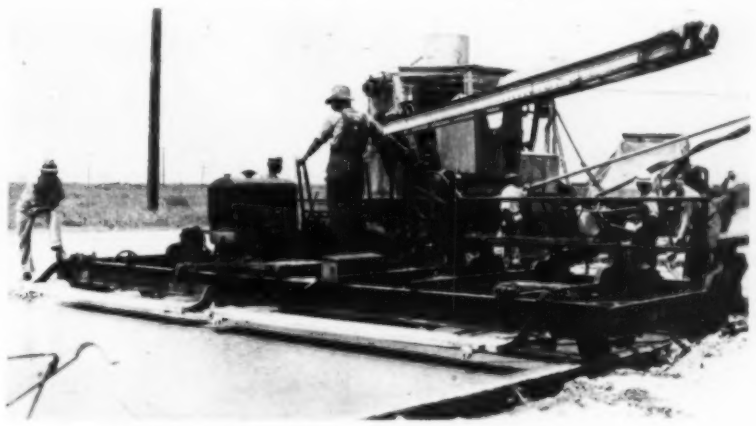
Put Finishing Touches on

Concrete Pavement



THREE MACHINES following paving mixer complete successive operations of (1) finishing slab surface, (2) installing ribbon-type longitudinal joint and (3) applying permanent two-color center-line stripe

TRAFFIC-LINE MACHINE carries longitudinal three-compartment box centered to guide installation of permanent colors in dividing stripe.



PANAMA-TYPE FINISHER. adjustable to widths from 18 to 24 ft., finishes 22½-ft. pavement on causeway approach at Galveston, Tex.

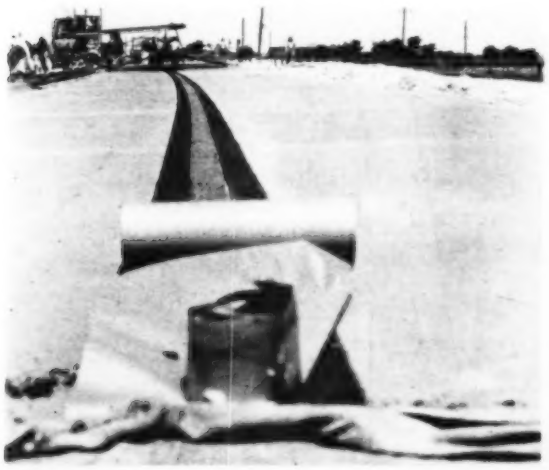
IN PAVING the Galveston Island approach to the new causeway at Galveston, Tex., Froemming-Kies, Inc., contractor, of Galveston, placed two 22½-ft. traffic lanes with an esplanade section in the center and a 6-in. integral curb on the inside edge of each lane. In addition to the regular traffic lanes there were two large intersections and one transition which tapered from 44 to 46 ft. in a distance of 278 ft. With the use of a Flexible Road Joint Machine Co.'s Panama-type finishing machine and its adaptability to varied widths, no difficult finishing problems were encountered. All the pavement on this project, including the transition and intersections, was machine-finished.

A cutter was placed on the finishing machine to cut a preliminary longitudinal groove for a center-line joint. Immediately following the finishing machine was a Flex-Plane combination longitudinal joint installing machine and rescreeding attachment. The longitudinal joint filler consisted of ribbon material. On the rear of the joint installing machine was a reciprocating rescreeding attachment; immediately behind this screed was a longitudinal float and belting attachment.

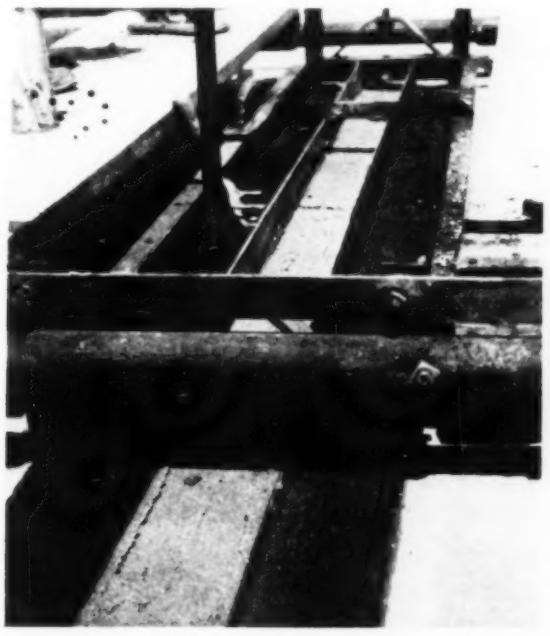
An 18-in. traffic stripe was placed in the concrete before the final set. This traffic marking consisted of a 6-in. yellow stripe between two 6-in. black stripes. Magnetic oxide used for both colors was worked into the pavement ¼ in. deep and floated to pavement finish. For installing the stripe, a hand-propelled machine with 18-in. wheels and chain drive to the rear axle was used. All four wheels were flanged to keep the machine in perfect line.

A three-compartment trough 7 ft. in length was built in the center of the machine, parallel to the pavement edge. This trough could be raised by means of a ratchet to permit the operator to move the machine forward, and likewise could be lowered for spreading the coloring materials and hand-floating into the pavement. Yellow oxide was placed in the center compartment, which was directly over the center of the pavement, and black was placed in each of the side compartments. The result of the operation was an attractive and straight stripe, and the two-color scheme is expected to be invaluable in guiding heavy traffic safely over this highway.

Working under the supervision of F. H. Kies, of Froemming-Kies, Inc., the paving crew completed the job in considerably less than the 60 days allowed by the Texas State Highway Department.



BUILT-IN TRAFFIC LINE 18 in. wide has central 6-in. yellow stripe and two 6-in. black stripes.



LONGITUDINAL BOX (right) on traffic-line marking machine has three compartments to guide application of contrasting colors in permanent three-stripe design.

Maintenance Superintendent Improvises

Serviceable Asphalt Plant

From Odds and Ends of Equipment

INGENIOUS ASSEMBLY of parts and materials salvaged from discarded machines and junk yards gives Monongalia County maintenance force of West Virginia State Road Commission a serviceable asphalt plant capable of producing 10 tons per hour of cold-lay material.

PARTS AND MATERIAL salvaged from discarded equipment or picked up from junk yards furnished all the necessary elements of a small asphalt mixing plant designed and erected at Morgantown, W. Va., under the direction of B. M. Chaplin, maintenance superintendent for the State Road Commission in Monongalia County. Made up of odd pieces of equipment, ranging from a length of corrugated metal culvert pipe for the dryer to a salvaged dough mixer for the mixing unit, the entire plant is ingeniously geared to an old automobile engine by a system of power take-offs and chain-and-sprocket drives which operate the various moving parts at speeds required to supply a maximum plant output of 10 tons an hour. Operated intermittently to mix cold-lay material for patching, widening and resurfacing pavement and superelevating curves, the plant in the first ten months of last year produced 3,500 tons. Three men operate the plant.

Aggregate Feed — Prepared limestone aggregate from a commercial quarry is dumped by trucks at the upper end of the dryer on a 12x16-ft. platform with sides about 3 ft. high. Connecting the platform with the dryer drum is a hopper fitted with a steel gate which can be adjusted to regulate the flow of material into the dryer. The gate is equipped with a vibrator which imparts a slight up and down motion, providing a constant flow of material.

Dryer — A rotary dryer was made out of a piece of 24-in. corrugated culvert pipe 14 ft. long, mounted on a shaft. The receiving end of the drum is elevated 3 ft. above the discharging end. Bolted to the inside of the drum are four Z-bars, running the full length of the pipe, designed to pick up and aerate the aggregate as it passes through the dryer. The drum rotates at a speed of 30 r.p.m.

In a region where natural gas is plentiful, two gas blast burners inserted in the discharge end of the drum are used instead of kerosene torches to supply heat for drying or warming the aggregate. Air for the blast is furnished by a two-cylinder belt-driven compressor reclaimed from a 6-ton roller that operated a scarifier attachment.

Elevator — After passing through the dryer, aggregates are carried to the top of the plant, through a height of about 28 ft., by an 8-in. belt-and-bucket elevator. The elevator was made at the local maintenance garage of welded sheet-iron buckets riveted to a canvas belt. At the top of the plant are two bins, one for coarse aggregate and one for dust or fine aggregate. Material carried up by the elevator is dumped into the proper bin.

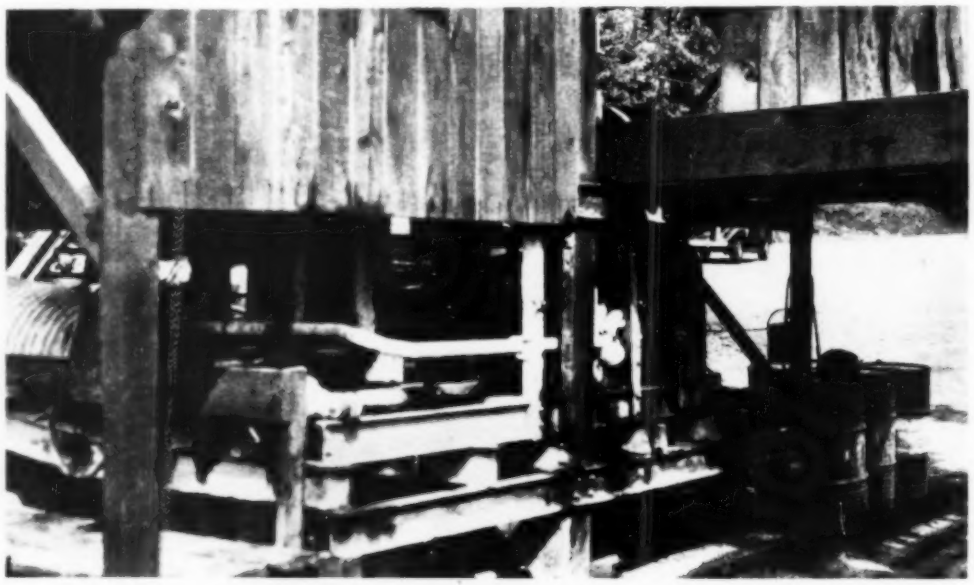
Batch box — An accurate measuring box is attached to the bottom of the bin, directly over the mixer. The box has two compartments, a 5-cu.ft. compartment for coarse aggregate and a 1-cu.ft. compartment for dust. As the mixer takes 10 cu.ft. of coarse material, the larger compartment has to be filled and dumped twice for each batch.

After asphalt has been thoroughly mixed with coarse aggregate in the mixer, 10 per cent of dust is added to the batch from the 1-cu.ft. compartment. When mixing is completed, the mixer is tilted to dump the batch into a 20-ton storage bin, elevated above a truck driveway.

Asphalt Equipment — Asphalt is heated in a discarded 150-gal. tar kettle on the ground and is pumped to a measuring trough above the mixer by a small single-cylinder, air-cooled gear pump, formerly used on a tank for hand spraying. The trough is graduated to permit measuring the correct quantities of asphalt for mixing coarse or fine aggregates. When the proper amount of asphalt has been delivered to the trough, the operator closes a valve on the suction end of the pump by a long rod which operates as a link or reverse lever.

Before dumping the asphalt into the mixer, the operator coats the stone with liquefying cutback oil, increasing the amount of oil to act as a retarding agent

(Continued on page 68)



SALVAGED GASOLINE ENGINE mounted on I-beam frame under mixer provides power through system of countershafts and sprocket-chain drives for operating mixer, air compressor, dryer drum and elevator.

JOB ODDITIES

A MONTHLY PAGE OF *Unusual Features of Construction*

TUBULAR STEEL SCAFFOLDING (left) 185 ft. high supports ski slide at Coliseum, Los Angeles, Calif., where artificial snow machines are used to cover slide and stadium infield. Safway steel scaffolding in 5x5-ft. tubular units is fabricated into bents of desired height, spaced 7 ft. apart and connected by cross-braces slipped over welded bolts on bent frames and tightened by thumb nuts. Scaffold later is moved and set up at San Francisco World's Fair for ski jumping exhibitions which continue day and night for two weeks.

THE INDIANS HAD A WORD FOR IT. While the 50-mi.-long lake formed by Parker dam, at the intake of the Colorado River aqueduct in California has not yet been officially named, this Mojave couple, oldest inhabitants of the flooded area, during recent visit to dam and intake pumping plant called reservoir "HAVASU," meaning "Blue Lake." Indian man, Haranai, is 102 years old and his wife, Ooach, 97 years.

SNAKY STUFF is this Usiflex-joint cast-iron pipe of United States Pipe & Foundry Co., designed primarily for submarine lines and made up with flexible joints which allow maximum deflection of 15 deg. in any direction. Tests indicate ability to maintain joint tightness under repeated flexure.

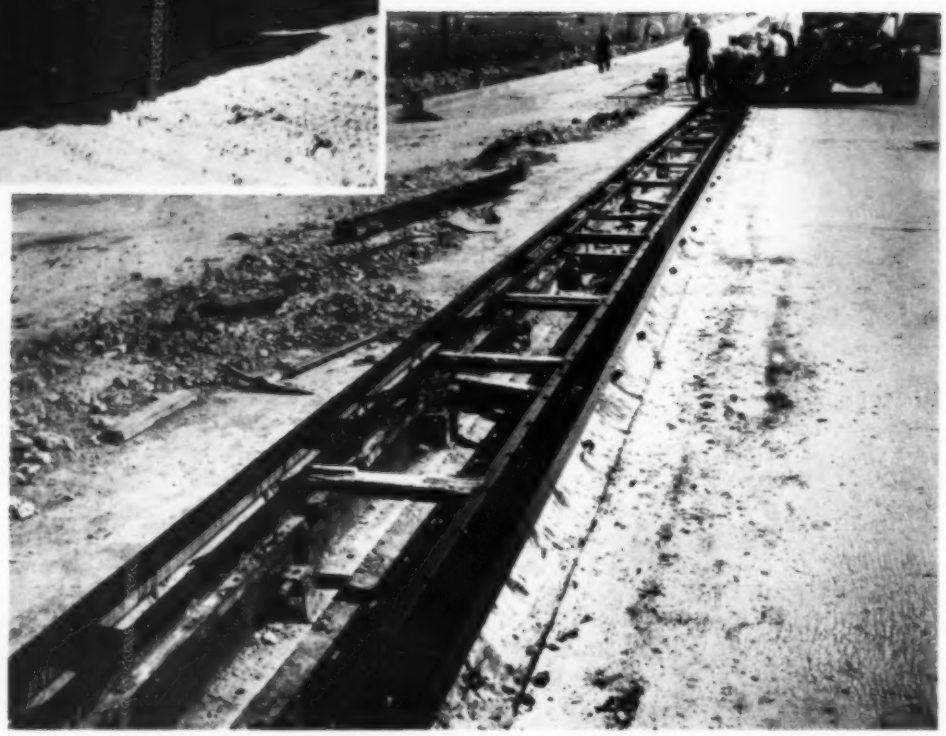
BACKYARD BRIDGE BUILDERS of R. C. Mahon Co., Detroit, assemble one of ten sections, 345 ft. long, weighing 600 tons, for steel arch bridge crossing Cuyahoga River, Cleveland, Ohio, and ream rivet holes before dismantling structure and shipping pieces by rail to destination.

"HEAVE-HO, MY HEARTIES, and put your back into it!" Steel-yard workers of U. S. Engineer Department bend 1¼-in. bars for Los Angeles River improvement, Los Angeles, Calif.

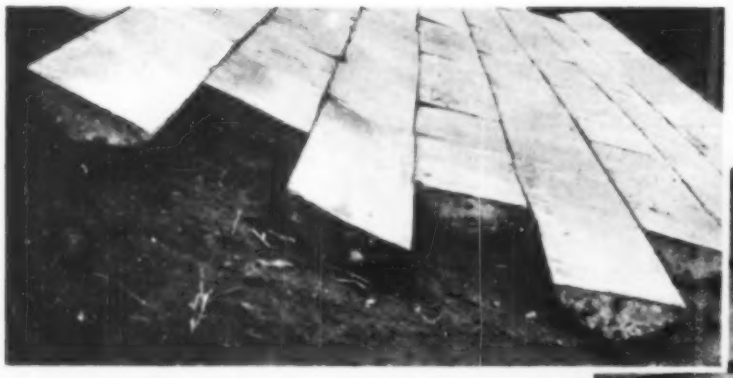
SHOVEL ATTACHMENT (left) on Model M Allis-Chalmers tractor, owned by Neils E. Stone, of Flushing, N. Y., loads 2-ton stone into truck in connection with grading of grounds at Seaview hospital, Staten Island, N. Y.

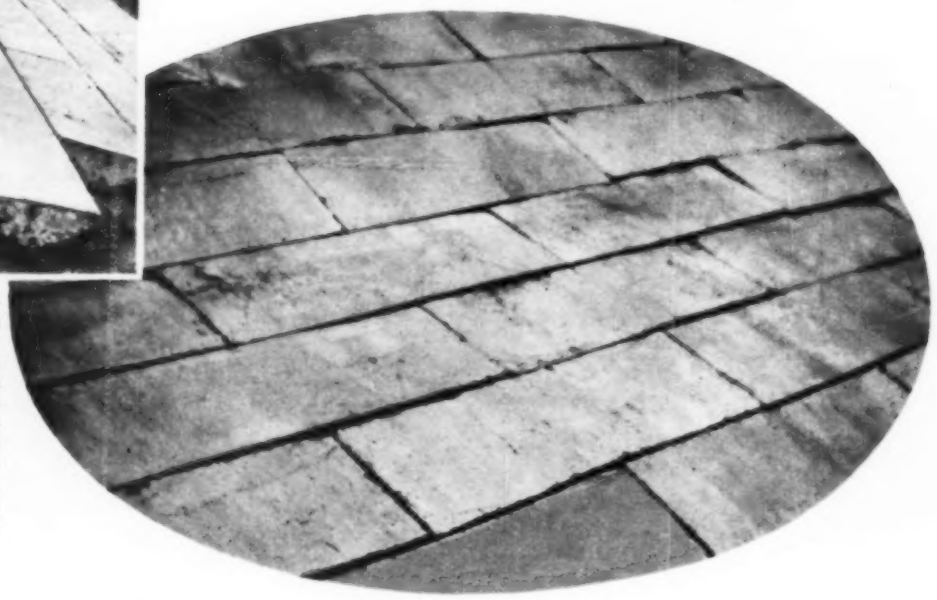
How They Did It

CONSTRUCTION DETAILS *For Superintendents and Foremen*

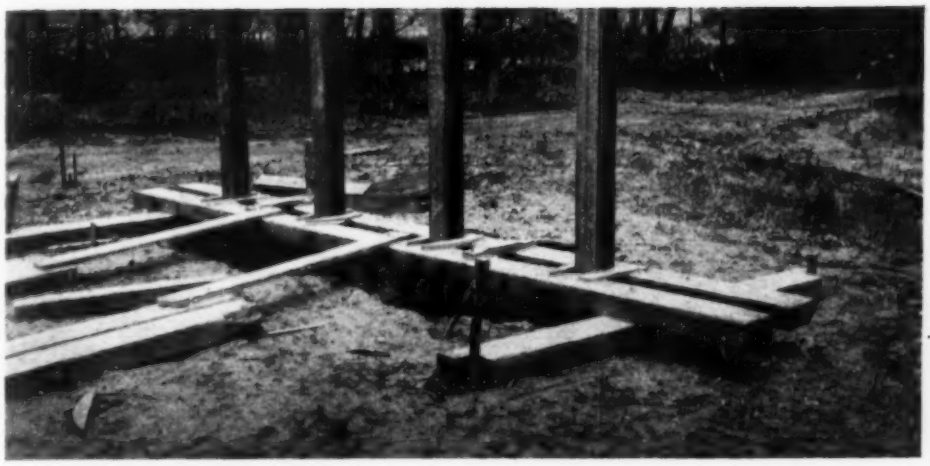


FACE FORM of Blaw-Knox steel integral-curb forms is keyed to division plates, eliminating projections above top of forms and avoiding obstructions to chute of truck mixer delivering concrete on Donatelli & Donatelli contract, Lebanon Church road, near Pittsburgh, Pa.

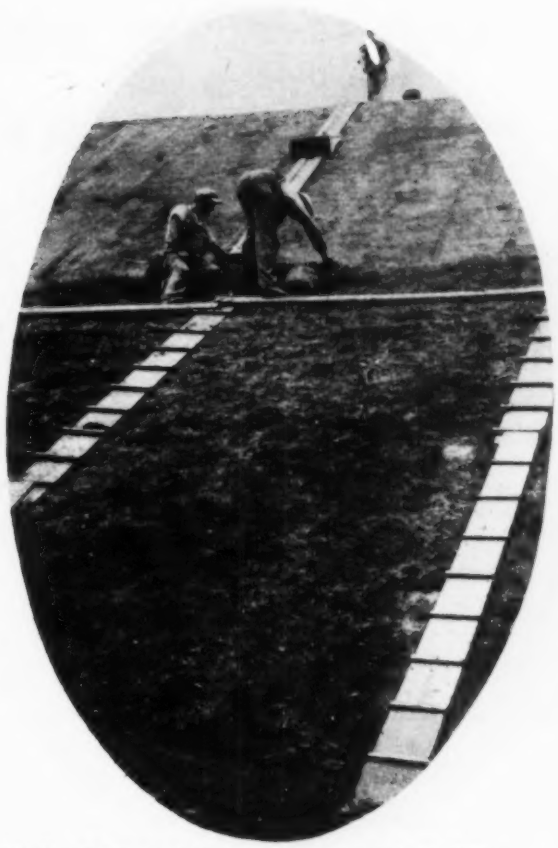




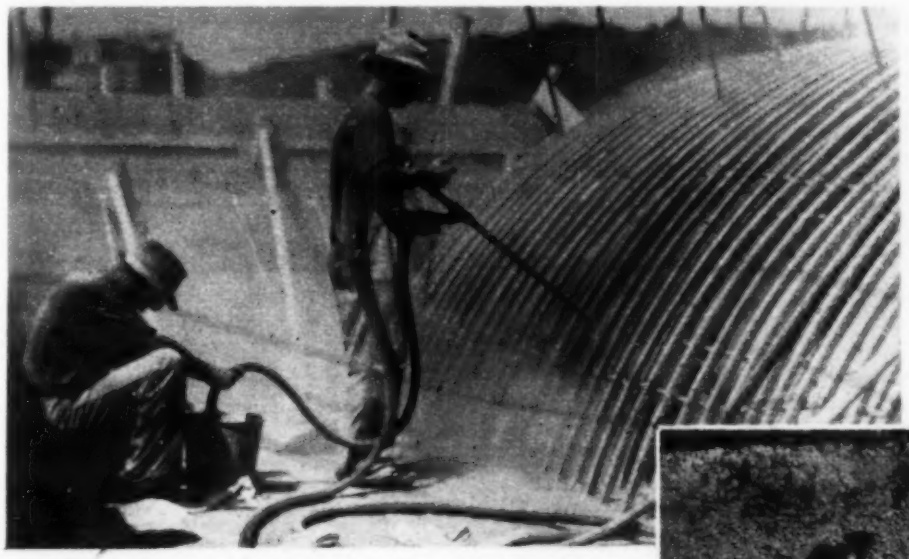
FLEXIBLE REVETMENT (above and **right)** made up of precast concrete blocks of triangular cross-section, threaded on wires, has been designed by W. R. Pierson, of Minneapolis, Minn., to protect river banks from scour and erosion. Blocks are of size (12x4x26 in.) for two-man handling and weigh 110 lb. each. Three blocks cover 1 sq.yd. V-shape of units is said to effect 30 per cent saving in concrete, to provide anchorage by embedding blocks in ground and to permit hinging near surface (for flexibility) by threading wire cables through ½-in. holes cast in blocks. With this type of block, 1 cu.yd. of concrete produces 12 sq.yd. of mattress revetment at cost which Mr. Pierson places at $1.50 per square yard.



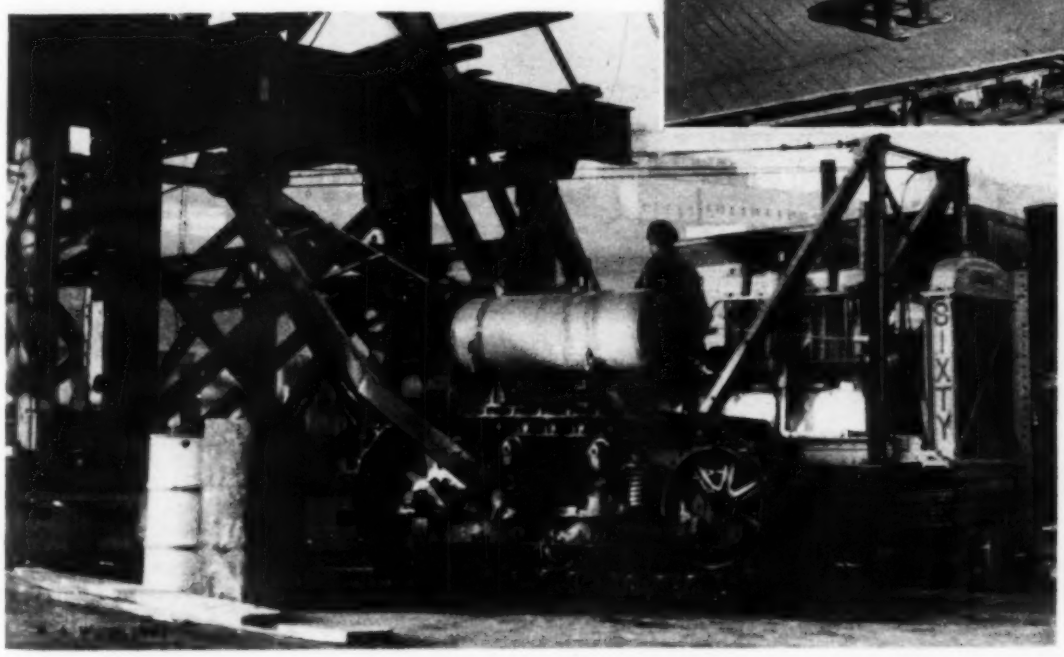
TO HOLD STEEL H-PILES in position during driving for approach bents of Black River bridge, Leeper, Mo., List & Clark, contractors, Kansas City, Mo., excavate trench about 5 ft. deep and center frame of 8x16-in. timbers before piles are set. Piles are plumbed both ways with carpenter's level at intervals while being driven. — Photo from D. C. WOLFE, Sverdrup & Parcel, consulting engineers, St. Louis, Mo.



SMALL SLED on board track drops sod to men working on bank of North Belleville belt-line highway project, constructed by Hoeffken Bros., Belleville, for Illinois Division of Highways — Photo from H. B. SENNOTT, district construction engineer, Illinois Division of Highways, Edgemont Sta., East St. Louis, Ill.



SAND BLAST cleans reinforcing steel around three 16-ft.-diameter penstocks in Marshall Ford Dam on Colorado River of Texas, Brown & Root, Inc., and McKenzie Construction Co., Austin, Tex., contractors. Just prior to starting concrete pour, workmen sand-blast steel to remove all rust, scale and cement. Forms, steel and top of previous lift then are washed with air-and-water jets before concrete is placed. — Photo from R. E. SALTER, Galveston, Tex.



TRAVELING MIXER mounted on rolling gantry bridge distributes sand-cement grout joint filler to monolithic brick pavement on U.S. 23 north of Delaware, Ohio, built by Elmer O. Vogt Construction Co., Masillon, Ohio, for State Department of Highways, as described in CONSTRUCTION Methods and Equipment, Feb., 1939, pp. 42-44, 88, 90.

HEAVY-DUTY TRACTOR CRANE (left) of George M. Brewster & Son, Inc., Bogota, N. J., contractor on Fourteenth St. viaduct, Hoboken, N. J., utilizes heavy rear-end boom pinned to crawler frames and operated by Willamette-Ersted double-drum hoist on Caterpillar 60-hp. tractor. Boom hoist cable is reeved through sheaves on gantry at front of machine, and tractor is counterweighted by steel plates under engine frame at forward end.

MICHIGAN HIGHWAY PUBLIC RELATIONS PROGRAM Makes Use of Many Avenues to Public's Attention

HIGHWAY ENGINEERS pride themselves on their technical knowledge and ability. And well they may. Most of the remarkable strides which have been made in this profession have been the result of close technical study and application. To the highway engineer, or any other engineer for that matter, technical terms and technical discussion are as natural as legal terms are to the lawyer or medical terms are to the physician.

When engineers gather to talk about subjects of engineering interest, a layman has as much chance of knowing the nature of their problems and the solutions under consideration as the patient usually does of his physical ailments and remedies when doctors gather to consult his particular symptoms.

The mere fact, however, that the patient cannot understand the language of the doctors does not by any means decrease his interest in what they are saying, what they are thinking and what they are going to do. And so it is with the average citizen and the engineer—especially the highway engineer in public service.

Need for Public Education—It is true that engineers know the technical answers to many of our highway traffic problems, but without the help of the general public, which in the long run must pay for projects, they are helpless.

In fact, we might trace some of the outstanding failures on the part of highway engineers not to a lack of technical knowledge but rather to a lack of funds or, in other words, a lack of cooperation and confidence on the part of the general public. How can the general public be brought to the full support of the engineer financially and otherwise? A few progressive engineers in this country believe they have found the answer in a program of "public relations."

It has often been illustrated that the general public is willing to come

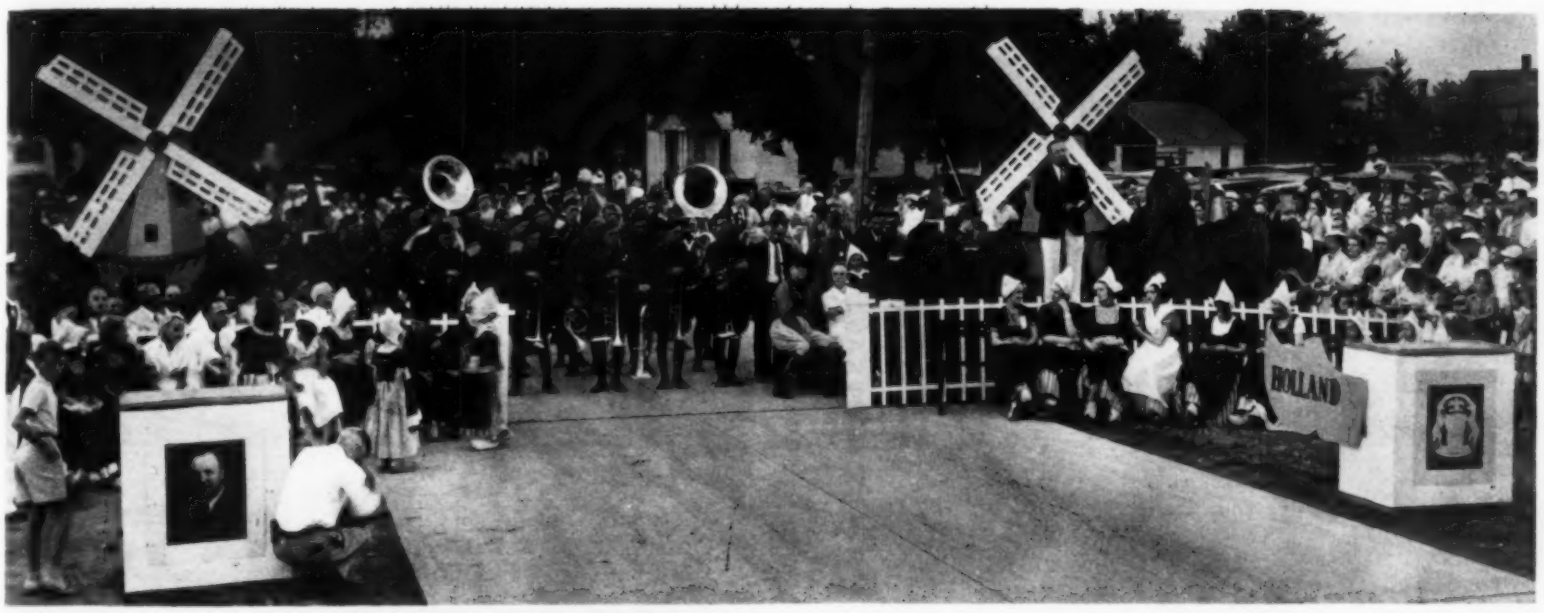
An Informed Public Serves the Best Interests of the State

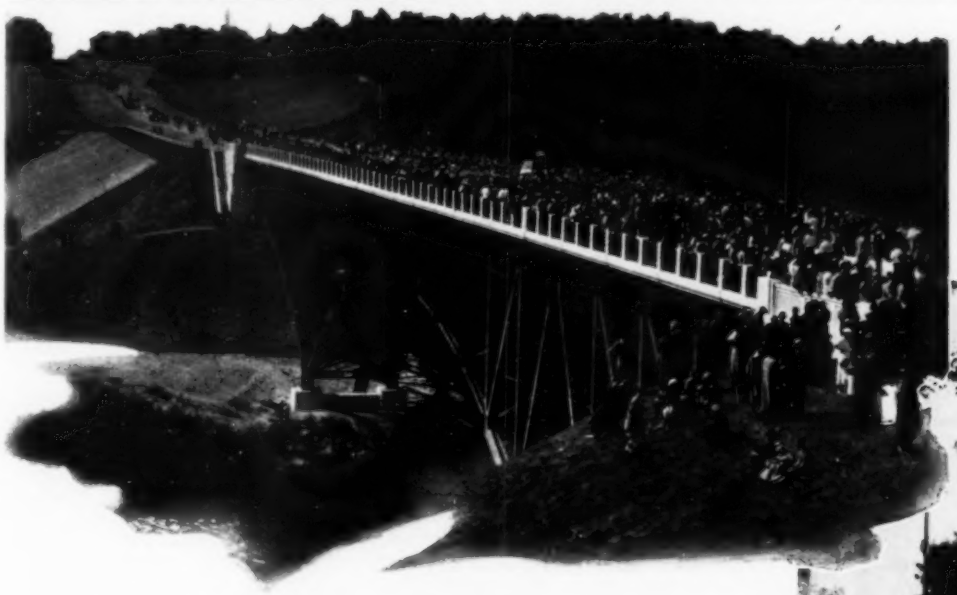
•

ON THE first Tuesday of last November, the people of Michigan at their polling places registered overwhelming approval of a state constitutional amendment outlawing diversion of highway revenues (license fees, gasoline taxes, etc.) to other than highway uses. The intelligently conceived and capably managed public relations program of the Michigan Highway Department, under the direction of Commissioner Murray D. Van Wagoner, played no small part in the passage of this constructive legislation. A report on campaign methods employed in Michigan is available to the 41 states without a similar constitutional guarantee.

On the same day last fall, the voters of two other states, California and New Hampshire, likewise voted anti-diversion amendments into their constitutions. The effective public relations work of the California Division of Highways, which deserves recognition as a powerful factor aiding adoption of the state amendment, was described in *Construction Methods & Equipment*, Feb. 1939, pp. 36-39, 78, 80, 82, 84, 86, by Earl Lee Kelly, former director of the State Department of Public Works.

TO ATTRACT TOURISTS and illustrate highway safety, scenes of this kind are distributed in form of photographs or moving pictures for public display.





DEDICATION CEREMONIES gain wide publicity and interest for newly completed projects and give opportunities to State Highway Department executives to carry important factual messages directly to large groups of people. CROWD GATHERS **(left)** at Mortimer E. Cooley bridge to hear speeches on dedication, day. IMPRESSIVE CEREMONIES **(above)** and speech by MURRAY D. VAN WAGONER, state highway commissioner, at microphone, mark opening of highway improvement near Holland, Mich.

to the aid of the highway engineer provided it understands and appreciates his problem and the part it may play in working out a solution. This message must be carried to the public, and generally speaking the engineer is not qualified to do the carrying.

Public Relations Program—At this point it may be well to point out that a sound public relations program does not involve flooding the mails with propaganda. Such a program seldom accomplishes its purpose. An intelligent program, however, does involve providing the public with accurate information about the problems, policies, and programs of highway departments in terms that can be easily understood by that much-talked-of individual, "the man in the street." Providing this information is a full-time job that should be turned over to a capable, well trained and complete staff.

In Michigan, the State Highway Department has carried out such a program for several years with the result that Michigan citizens appreciate good roads and the necessity for adequately supporting them. The Michigan Highway Department enjoys the full cooperation of the citizens it serves. They are acquainted with the general aspects of highway construction, maintenance and financing.

A public relations program involves not only the administrative officers of a highway department. It involves every field man from district heads on down to project engineers and rodmen. They must be informed of programs and policies in simple nontechnical terms to enable them to discuss these matters intelligently with friends and associates. Disseminating correct information through employees is a public relations program in its simplest form.

Access to Public—A complete public relations program makes use of many avenues to the public's attention.

Newspaper correspondents always include highway offices on their regular beats. Without the assistance of a public relations division, these men must, because of a lack of time and familiarity with the organization, miss

STRESSING SAFETY in highway travel, Public Relations Division distributes photographs for publication illustrating methods used by Highway Department to make roads safer for motorist. Same theme is emphasized in motion pictures released for showing by clubs, schools and associations.

Mud ... shale ... rock ... heavy cuts and deep fills in mountainous country — these are the conditions faced by the contractors. And they've got to step on it ... penalties start by mid-1940. That's why Allis-Chalmers tractors are handling so much of the work. Their sure-footed traction and extra reserve power pick up heaping scraper loads of shale. ***FASTER POWER*** moves those big loads to the fill at speeds up to 564 feet per minute (nearly 100 feet faster than ever before possible with big tractors). This extra speed, plus quick pick-up and fast maneu-

Use the fuel that's best in your locality—gasoline, Diesel oil or butane. With Allis-Chalmers tractors you can get a full, even flow of power from any one of these fuels.

Shale AT DIRT PRICES

Down pressure on the cutting edge, plus A-C reserve power, enables this Gar Wood scraper to bite a big load out of Pennsylvania shale, thus handle material usually requiring shovels and trucks.

vering ability, adds extra payloads to every shift ... makes possible moving shale at dirt prices ... gets work done ahead of schedule.

Try ***FASTER POWER*** on your tough jobs. Ask your Allis-Chalmers dealer to demonstrate.

ALLIS-CHALMERS POWER

TRACTORS — IT DOESN'T COST • IT PAYS — ENGINES • ROAD MACHINERY

TRACTOR DIVISION, MILWAUKEE, U.S.A.

A $60,000,000 roadway with no speed limit ... all towns by-passed ... grade separations at every railroad and highway crossing ... maximum grade 3% ... all curves spiraled and superelevated for 60 m.p.h. travel ... 161 miles, four lanes wide, for those who want to step on the gas—that's the Trans-Mountain Toll Highway now under construction between Harrisburg and Pittsburgh. Both Harry T. Campbell Sons Co., and Girard Construction Co., the earthmoving contractors now on the project, use ***FASTER POWER*** to speed their work.

many news items of importance and interest to newspaper readers. Furthermore, they find it difficult to obtain a clear picture of the news when it is given them in the technical language of an engineer. The necessary explanations are difficult and take too much of the engineer's and the reporter's time.

As a further consideration, the weekly press is usually without close representation in capital cities; yet the weekly newspapers should receive all items of general importance, as well as information regarding plans and problems in their particular localities. If this information is to be provided in a complete and understandable fashion for both the capitol correspondent and the weekly press, it must be prepared by somebody who recognizes news when he sees it and who has the opportunity to become familiar with the department and its work.

Radio Programs—But newspapers are not the only avenue to the public's attention. Radio stations are usually glad to present worthwhile programs dealing with highway affairs. These programs will not be acceptable if they are in the form of the customary engineering report. They must be in simple terms and they must be interesting and entertaining. During 1937, the Michigan State Highway Department had 15-minute weekly programs on eighteen different radio stations.

Motion Pictures—Luncheon clubs, schools, civic groups and other organizations are keenly interested in public affairs. Naturally, they are eager to obtain understandable information about the highway system of their state and nation. Speeches prepared by a public relations man can be placed in the hands of technical men, or non-technical men for that matter, to carry important messages to these groups. One of the best methods available for reaching such groups is found in moving pictures. It is even possible to dispense with speakers by using "talkies." Films which are both entertaining and educational can be produced at moderate costs.

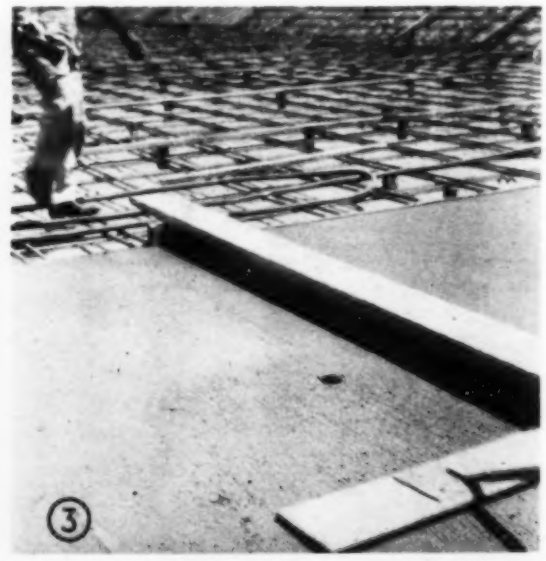
EXHIBITS by State Highway Department at conventions, fairs and large gatherings gain attention of thousands.

Exhibits—A highway department can make good use of exhibits. There are many phases of highway work which lend themselves to exceptional exhibit treatment. A thorough public relations division can devise exhibits to attract public notice and arrange to show them at a minimum cost at fairs, expositions, conventions and other public occasions.

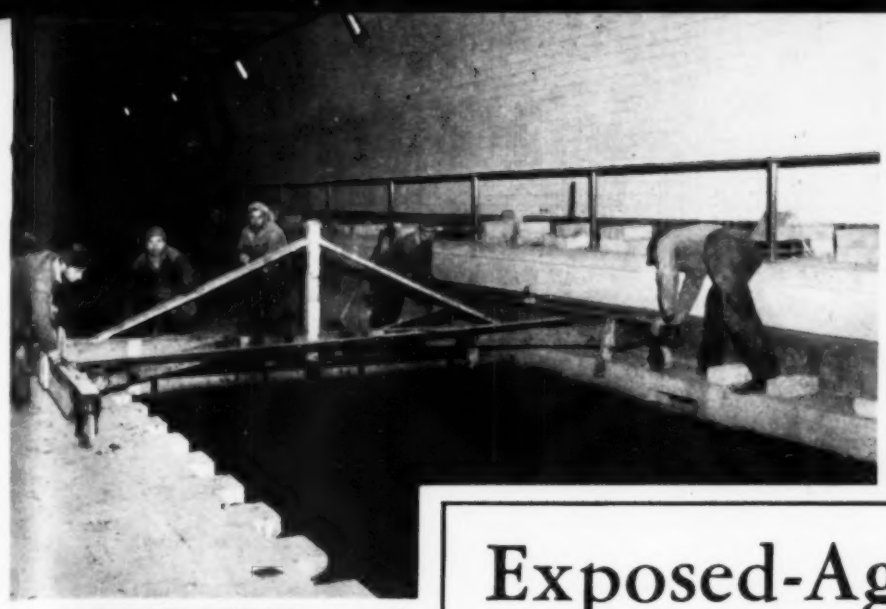
One Year's Records—In this connection, the Michigan State Highway Department offers some interesting figures on its public relations program during 1937. Highway motion pictures were shown to a total of more than 234,000 persons. Exhibits were viewed by more than 1,000,000 persons, and speakers appeared before various groups on 272 different occasions.

Basis of Success—A successful program of public relations must be based on an honest effort to be frank and accurate with the public. It should be built on the idea that the public has a right to know the affairs and policies of the department. Good will is as essential in solving the problems of public business as it is in solving those of private business. Engineering is and always will be a technical profession, but its work is a matter of vital interest and concern to the general public.

JOB-MADE MANDREL *Puts Weep Pipes in Concrete*



IN PLACING CONCRETE paving in Gila desilting basin on Arizona side of Colorado River as part of Imperial dam project for U. S. Bureau of Reclamation, Morrison-Utah-Winston, contractors, faced problem of installing several thousand 2-in. weep pipes in 8-in. concrete slab. After experimenting with several methods, "Dutch" Riddle, one of carpenter foremen, developed successful procedure illustrated: (1) Special mandrel, at left, is used to place weep pipe, at right; (2) workman installs pipe in slab just after concrete has been struck off to grade; (3) with pipe in place, final finishing is completed. — *Photos and data from* CHARLES S. BRADLEY, *engineer, Morrison-Utah-Winston, Yuma, Ariz.*



STRIKEOFF TEMPLET supported from long wheelbase chassis screeds sand-asphalt bedding course to smooth surface.

PRECAST CONCRETE BLOCKS (11¾x11¾x4 in.) weighing 50 lb. each are dropped by hand. Along roadway center line, contrasting white-cement blocks in alternate courses provide permanent traffic markers separating two lanes.

Exposed-Aggregate CONCRETE BLOCKS *Pave Vehicular Tunnel Roadway*

TO MEET A CONDITION which indicated use of replaceable paving units with a durable wearing surface which would retain good tractive qualities under traffic, the Port of New York Authority paved the roadway of the 178th St. vehicular tunnel, providing a direct approach to the New York end of the George Washington bridge, with precast concrete blocks incorporating exposed trap rock aggregate in the upper face. The blocks, measuring 11¾x11¾ in. by 4 in. deep, were laid on a sand mastic cushion spread over concrete base which was placed on top of the original concrete foundation, poured when the bore was driven in 1930 and 1931. Final tile lining of the tunnel walls and paving of the roadway had to wait until funds became available to do this work and to build additional bridge approach ramps, at present about 50 per cent complete.

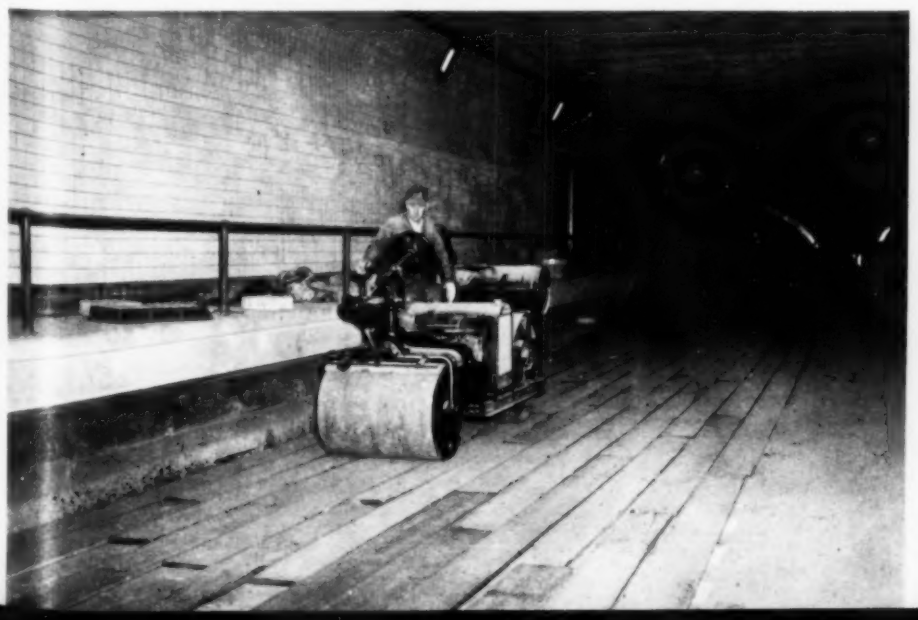
Driven through seamy rock, with two rectangular ventilation ducts set into the rock wall at the south side of the two-lane traffic tube, the tunnel since 1931 has been subject to water infiltration at construction joints and cracks in the foundation concrete. The concrete foundation mat rests directly on Manhattan mica schist. Transverse ducts pass at intervals through depressed, thickened sections of the foundation mat to carry fresh air from the main supply duct to expansion-dam outlets in the opposite wall of the tunnel. Vitiated air is drawn through ports in the tunnel ceiling and thence into the exhaust air duct. The roadway drains into conduits incased in concrete behind the curbs; the conduits discharge into a city sewer near the eastern portal of the tunnel. In the intervening years since completion of the original excavation and tunnel lining, natural causes had produced a network of cracks in the concrete foundation.

Before placing the new 4-in. concrete base on top of the original foundation, Frank Mascali & Sons, Inc., contractor, Bronx, N. Y., set forms for drainage channels longitudinally near the curb lines of the entire length of the tunnel and transversely wherever infiltration had occurred. Steel cover plates were set in position on top of the drainage-channel forms, flush with the finished grade of the 4-in. base, before concrete was placed, and the plates were concreted in the base. To facilitate flushing of the drainage channels and the fresh air flues, which have a tendency to silt up, the design provided flushing plugs in the drainage channels consisting of vertical holes extending downward from the channels into the transverse fresh air ducts. The base was concreted to full roadway width with truck mixers and was screeded in the usual manner.

Roadway Paving—Because of maintenance troubles that may be expected to occur in the base, the Port Authority considered it particularly important that the roadway be surfaced with paving units which could be readily taken up and replaced. The roadway has a length of about 2,200 ft. and a clear width of 22 ft. between curbs, and the Mascali contract involved a

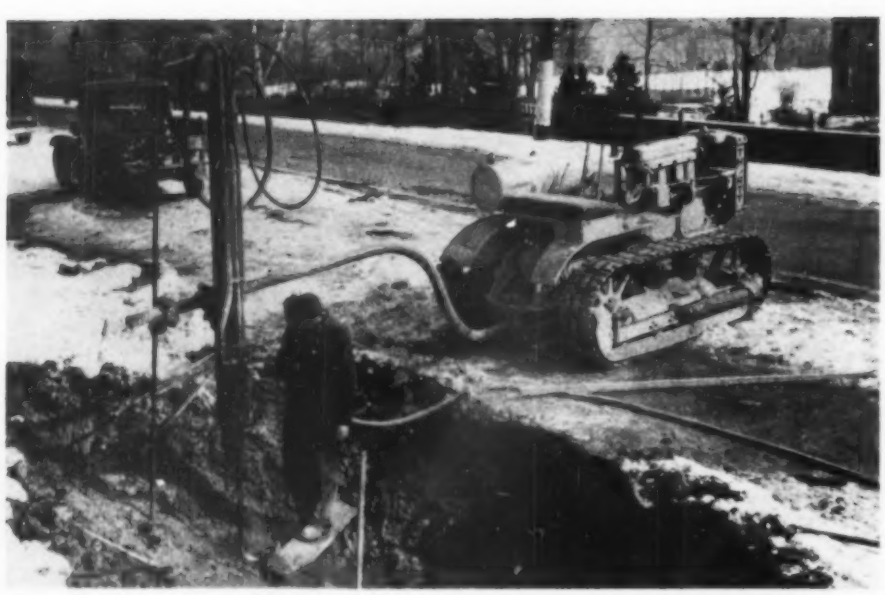
(Continued on page 70)

ROLLING ON BOARDS. 5-ton tandem roller **(below)** beds blocks uniformly in sand-mastic cushion, producing smooth-riding surface without punishment to paving units.



HAND POURING POTS (below) feed hot asphalt into ¼-in. joints between paving blocks, following application of separating medium to top surface of blocks to facilitate later stripping of excess asphalt.

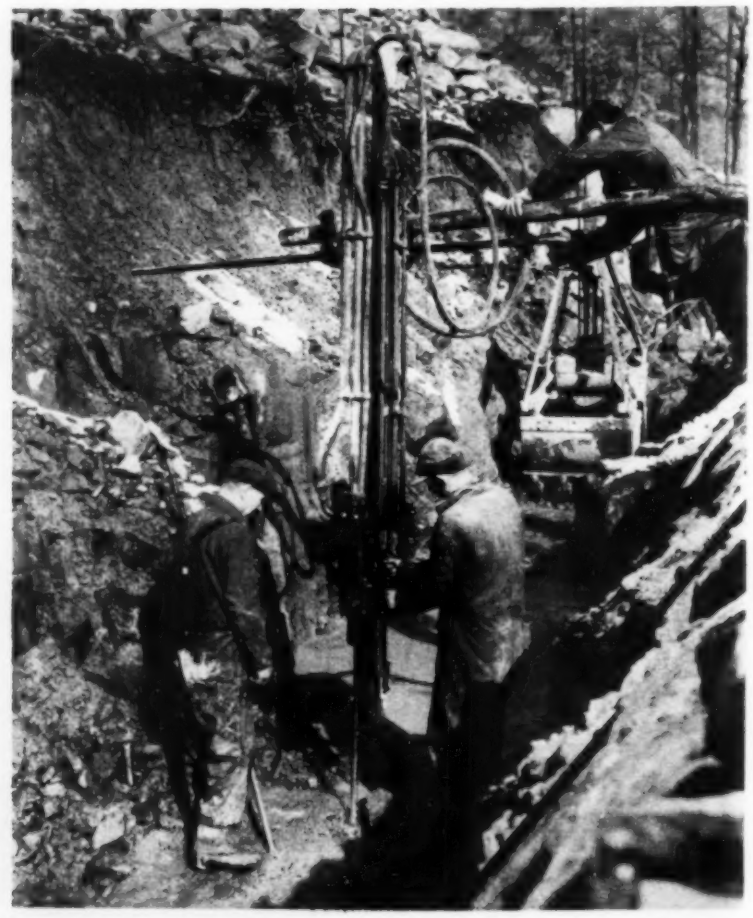
TRACTOR-MOUNTED DRIFTER S



1 **MOBILE DRILLING OUTFIT** consisting of pneumatic-feed drifter on tubular bar attached to tractor sinks 14-ft. blast hole in rock trench.

2 **REVOLVED ABOUT SWIVEL MOUNTING** to horizontal position, drifter is made ready for transfer to new location.

3 **SPOTTED OVER DEEP TRENCH.** feed cylinder is slipped through sliding trunnion until hole spotter, located at front end of cylinder, is 1 ft. from rock. Drill steel holds hammer engine while feed cylinder is being adjusted. Operator with slight effort can make minute adjustment to any point in 6½ ft. of travel.



4 **AFTER REMOVING** long steel, operator inserts short starting steel in chuck and collars pop-hole. As an example of speed with which tractor-mounted rig is maneuvered on job, entire operation from completing 14-ft. hole to completing 2-ft. pop-hole, including 400-ft. move, takes less than 10 min.

Speeds Drilling Progress in Rock Trench

BY BOLTING an ingenious rear-end cantilever drilling bar to an old 30-hp. tractor, Kemp Bros., Inc., contractors, of Ridgefield, N. J., have created a mobile drill mounting which enables them to increase speed and cut costs of rock drilling in sewer trenches at Englewood Cliffs, N. J. A piece of heavy seamless steel tubing 21 ft. long, bent in the shape of a crank handle and fitted with welded gussets and angles for bolting to the under side of the tractor frame, projects 12 ft. beyond the rear end and provides about 9½ ft. of straight-run pipe along which the drill mounting can be set. By maneuvering the tractor on the trench bank and making simple adjustments in the flexible drill mounting, it is possible to spot the drill quickly at any point in the trench.

On the drilling bar, the contractors mount a 300-lb. pneumatic-feed drifter with a 6-ft. drill steel change. The drifter assembly incorporates several features which make the unit adaptable to a variety of drilling conditions. A double-swivel mounting permits the drill to operate in any direction and at any angle. By virtue of a sliding trunnion, the drill guides may be lowered as much as 6½ ft. toward the bottom of a deep trench, obviating the necessity of drilling with long steel. At the front end of the feed cylinder is a quick-locking hole spotter which clasps the steel and holds it in position while a new hole is being collared, eliminating danger to the operator.

Operating their newly devised drill rig, Kemp Bros. make as much progress with one operator as could be made with three operators using hand-held hammer drills. The speed and ease of making moves by maneuvering the tractor on the bank represent a great gain over the difficulty of shifting a light wagon drill in the narrow trench or supporting it on staging over the ditch. In addition, the faster drilling speed of the drifter, compared with a jackhammer, makes moves for pop holes profitable. With the tractor mounting, the drifter can be spotted quickly, and holes can be drilled vertically or at an angle in any part of the trench.

THREE BROTHERS share responsibility for efficient methods and excellent condition of equipment to be found on Kemp Bros. contracts. Left to right: RICHARD W. KEMP, treasurer; WARREN D. KEMP, secretary; WILBUR E. KEMP, president.

Contract Quantities—Trench is being excavated for 1,900 ft. of 24-in. pipe and 750 ft. of 10-in. pipe, included in a $40,000 contract. Excavation involves about 1,300 cu.yd. of earth and about 6,000 cu.yd. of rock. Trench for the 24-in. pipe is excavated to a bottom width of 3 ft. The deepest rock cut is about 21 ft. Excavation is paid for on a batter of ¼ to 1, allowing a top width of 12 ft. for 18-ft. rock cut. The job lies on top of the Hudson River Palisades, and the rock is a hard, deep-seated diabase (trap rock) for which this region is famous. Using detachable bits in this material, the tractor-mounted drill averages 200 lin.ft. of hole in 8 hr.

Tractor Attachment—Engineering design of the tractor attachment was executed by the Worthington Pump & Machinery Corp., and application for a patent has been made by this concern. The tubing is 3½ in. O.D., with ¾-in. wall thickness. It passes through two ½-in. steel gusset plates to which it is arc-welded circumferentially. The plates are reinforced with 1½-in. welded stiffener angles and are welded at the top to 2-in. bolting angles. At the rear connection, which carries all the load, the gusset is fastened to the tractor drawbar with three 1¼-in. bolts. Two cap screws fasten the forward gusset to the tractor frame under the engine. The contractors made up the welded assembly, which then was attached to the tractor in 10 min.

Drifter Drill—A Worthington WP-180 drifter drill from a Rock Master light wagon rig is used on the tractor bar. Air requirements of this drill amount to 200 c.f.m., supplied by a Worthington two-stage air-cooled 315 c.f.m. compressor which also furnishes air to a hand-held hammer drill occasionally used for spot-holding in excavated trench behind the tractor outfit. Vibration of the drilling engine is cushioned by the air in the pneumatic feed cylinder and does not reach the tractor. By reversing the air in the feed cylinder, the operator can retract drill steel quickly from the hole. Levers to control the feed cylinder, the drilling engine and the air tube for dry blowing are centralized to facilitate manipulation by the operator.

The drilling attachment is mounted on a 10-year-old tractor, valued at about $600, readily convertible to other uses. A bulldozer for backfilling can be attached to the front of the tractor without removing the drilling bar. Savings obtained through increased drilling speed more than compensate for tractor charges.

HOME-MADE SPREADER

Distributes Stone Evenly

A FAN-TAIL SPREADER of home-made construction gave even distribution of fine stone for finishing the top surface of a Virginia highway. The device, mounted on the rear end of a motor truck, consists of a piece of sheet iron, some angle irons to form vanes and a few feet of chain. S. L. Carpenter, Luray, Va., supplied the accompanying photograph and data.

AFTER STARTING first few sheetpiles in close clearance under bridge by driving against wire-rope sling, contractor lowers remaining piles to receive hammer by keying them to adjacent sheets being driven.

Ingenious Methods Place and Drive

Sheetpile Bulkhead In Zero Clearance

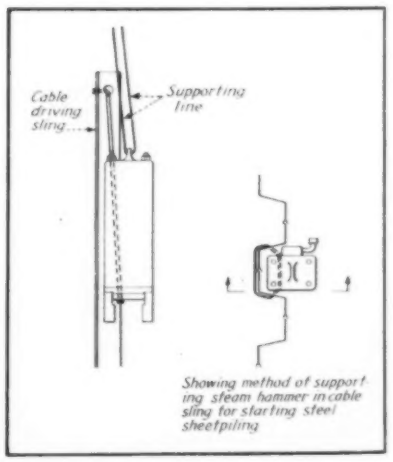
By EDWIN R. ALBERTSON
Belmar, N. J.

ADROIT METHODS of setting and starting sheetpiles for a pier protection bulkhead under a new bridge at Belmar, N. J., enabled the Merritt-Chapman & McLean Corp., Baltimore, Md., contractor, to put a complete section of assembled bulkhead in position in one piece and to start driving of individual sheets with a double-acting steam hammer in zero head-room. Chain blocks under the bridge pulled the assembled bulkhead into position after it had been carried downstream by a floating crane, and an ingenious wire-rope sling hung from the piles permitted the hammer to start two sheets by driving against the sling. After some sheets had been started, adjoining piles were pulled down by keying them to sheets being driven.

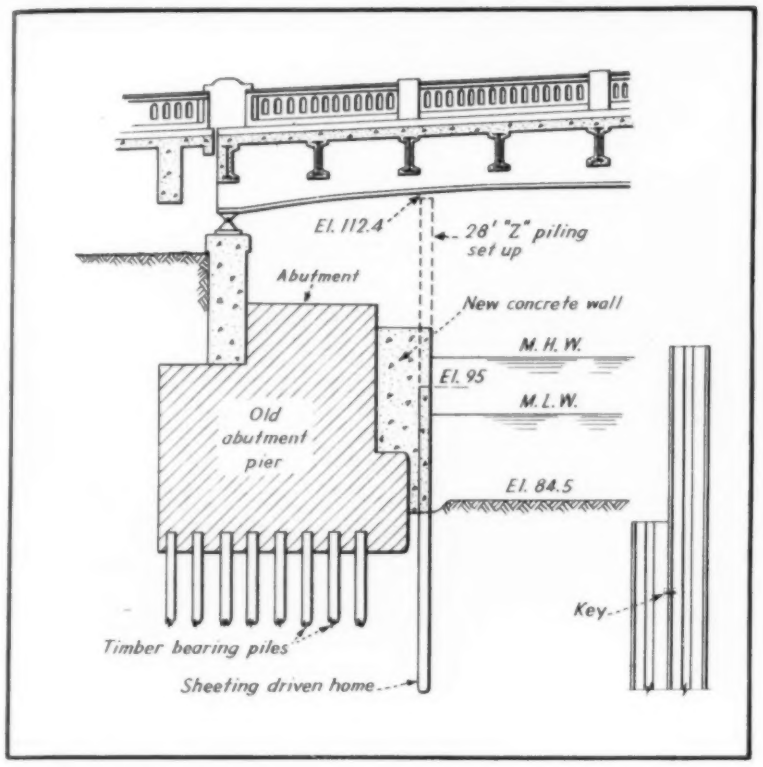
Need for Bulkhead—During prior construction by the same contractor of the new bridge, carrying Ocean Ave., Belmar, across the mouth of the Shark River, swift tidal currents, together with the heavy ground swells which sweep in from the Atlantic, made special care necessary in cofferdamming for river piers. An old bridge at the same site was completely removed except for the north abutment pier, upon which the new abutment was erected.

Two river piers and two abutment piers support the three spans of the new crossing. The south abutment is situated entirely behind a concrete sheetpile bulkhead with which both sides of the river are lined for some

ASSEMBLED UPSTREAM FROM BRIDGE. bulkhead of Z-section sheetpiles is made ready for transportation on load line of floating whirley crane.


Cable driving sling
Supporting line
Showing method of supporting steam hammer in cable sling for starting steel sheetpiling

CABLE SLING through two adjoining Z-piles serves as driving halter for steam hammer in pulling piles down to provide working clearance at top of sheets.



TIGHT CLEARANCE under bridge girders causes difficulty in setting and starting steel sheetpiles for pier protection bulkhead. Detail at right shows method of keying piles to start high pile while low pile is being driven.

DIRECTING WORK for Merritt-Chapman & McLean Corp., are two men in foreground, without hats: GROVER C. DENNY (left), superintendent, and W. R. (Terry) MAUL, office manager. At left and in background are two inspectors, Mr. King and Mr. Reid.

distance back from the ocean. The old north abutment pier was built with its face in line with the concrete bulkhead and exposed to the river.

At both sides of the inlet are short jetties extending out to sea. An extension to the south jetty, made about 10 years ago, resulted in deepening of the channel at the mouth of the river. A further extension of the south jetty has been contemplated for some time, and it appears that this improvement will be made in the near future. Additional scour of the river bottom, as a result of the proposed extension, would almost certainly result in undercutting of the old north pier and exposure of the timber piles to the teredos. To prevent this damage, it was decided to protect the pier by means of a steel sheetpile bulkhead, located 5 ft. out from the face of the pier to clear the projecting footing.

Close Clearance—As the new bulkhead had to be constructed under the completed bridge, lack of headroom made it difficult to place and drive the piling. The design called for Z-type steel sheeting 28 ft. long, and the actual clearance from the river bottom to the underside of the bridge girders at this point was hardly 28 ft. This difficulty could have been overcome by driving the sheeting in two lengths, but a better job was obtained by using full 28-ft. pieces. High spots on the river bottom were cut down with a water jet, using a five-stage centrifugal pump.

Rejected Method — Because the sheets could not be threaded together under the bridge, it was necessary to assemble the entire bulkhead in the clear before setting it in place. The original plan for placing the sheeting was to assemble and hang the sheets from a steel wale along the side of a barge. The barge was then to have been floated downstream under the bridge, with an ebb tide at the predetermined stage, and the sheetpile wall spotted in place in front of the pier. As the tide fell the sheeting would land on bottom and the barge would pull out from under the wale. With so little margin of clearance in which to work it would have been necessary to pick a day when there were no ground swells running. To wait for such a condition might have entailed considerable delay, and the scheme was abandoned for one which was independent of tides and ground swells.

Placing Bulkhead — Sheeting was assembled in vertical position against the concrete bulkhead west of the bridge, using a whirley crane mounted on a barge. The bridge is 57 ft. wide, and the new bulkhead extends beyond the bridge on both sides. The assembled sheets were trussed with steel channels and cables so that they could be picked up from the center point by a cable from the whirley. Carrying the assembled bulkhead in this way, the barge floated downstream toward the bridge.

Four chain blocks were hung at intervals under the bridge by means of timbers spanning between the bottom flanges of the floor beams. The sheeting fouled on the bottom shortly after it started under the bridge. The first chain block was then brought into action, exerting both a lift and a pull on the sheeting. As the wall moved farther under the bridge, additional chain blocks were engaged, and the cable from the whirley was moved nearer the far end of the wall. The entire load was finally transferred to the chain blocks, and the sheeting was landed in place.

Driving Sheetpiles — Under the bridge, the sheeting was driven with a double-acting steam hammer, starting near the middle of the wall. To provide enough clearance for the hammer, the piling had to be lowered

(Continued on page 68)

SMALL CONCRETE PUMP

Feeds Mixture to Bridge Decks

PORTABLE CONCRETE PUMP furnished deck slab concrete to four rolled-girder bridges built by J. C. O'Connor & Sons, Inc., Fort Wayne, Ind., contractor, on Lincoln Highway near Valparaiso, Ind. The Rex Pumpcrete unit in accompanying photograph, with capacity of 15 to 20 cu.yd. per hour, has just finished placing section of deck, and one man is flushing hopper of machine with hose while second man, beyond pump, is inserting "Go-Devil" swab in open end of pipe line preparatory to forcing this device through entire length of line to clean pipe. Truck mixers from commercial plant supplied ready-mixed concrete to hopper of pump.

RIVER REMODELERS

PROTECT LOS ANGELES FROM FLOODS

CONSTRUCTING a custom-built flood channel 14 mi. in length to accommodate 200,000 sec.-ft. without damage to riparian property, the engineers and superintendents on this page have directed operations on various portions of the Los Angeles River flood control project for the U. S. Engineers, detailed to complete the job by December 1, 1938, with $14,000,000 allotted to them on July 1. Day labor to the number of 9,000 men, working in three shifts, was employed by the Engineer Department at the peak of operations.

J. C. MORGAN, engineer in charge of Mariposa St. section.

LIEUT. ELLIS WILHOYT, engineer, Fletcher Drive section.

E. B. FONTAINE, engineer, Sec. 2, Burbank Wash.

J. H. HEIDMILLER, engineer, De Soto St. section.

Lieut. H. E. HALLOCK, engineer in charge of Main St. section.

LEONARD G. HOGUE, engineer, Verdugo Wash section.

O. C. HARTMAN, engineer, Colorado St. section.

Mr. EATON, in charge of Area 2 base yard and batching plant.

PAUL A. HACK, engineer, Aviation Drive section.

SAM J. MANNEL, construction superintendent in charge of Area 2 base yard, supplying steel.

KENNETH HARRISON, construction superintendent, in charge of Area 3 yard, supplies steel and makes form panels for retaining walls.

CONSTRUCTION EQUIPMENT NEWS

(ALL RIGHTS RESERVED)

Review of Construction Machinery and Materials for APRIL 1939

ROCK CHIPS for the seal coat of bituminous road surfaces are produced, as a by-product, by a new screening arrangement on the Pioneer vibrator duplex crushing plant. The chips are produced at the same time that the plant is turning out larger-sized stone for the base course of roads. There is no waste material, as the crusher dust is screened out of the chips and mixed with the road stone. No extra screens or equipment are required nor is total production curtailed. Bottom deck of crushing plant is used to screen pit run material only, while top deck screens crushed material only. Pit material and crushed material are not mixed so that it is possible to screen out 100 per cent crusher chips on top deck. Spouts deliver chips to belt conveyor. — **Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis, Minn.**

DUAL TANDEM-DRIVE TRACTION is now available on ½ yd. mobile truck-shovel **(left).** Built for quick conversion from shovel to crane, dragline, clam or trench hoe and making versatile machine for use of road builders and contractors.

Balance is achieved by special chassis design which permits an unusually low center of gravity. High tensile alloy steel is used for chassis. Tires are 9.00-20, with Westinghouse air brakes on all wheels. Either gas or diesel power is available. Ball bearings are provided on turntable hook rollers and all drum shafts. Finger-tip air controls operate shovel, which swings in full circle.

Cab has full vision, and operator convenience has been considered throughout machine. Speed and handling ease of truck make it practical to move unit to road jobs or building operations in varied locations. — **Michigan Power Shovel Co., Benton Harbor, Mich.**

MEDIUM-SIZE MOTOR GRADER (right) of improved design is capable of building and maintaining roads from bank to bank, including backsloping. Monomember frame of narrow welded box-type construction on Model No. 302 insures better blade visibility and wider range of blade positions. Powered by International tractor with 45½-hp. gas engine. Standard equipment includes 12 ft. x 9/16-in. moldboard with either tandem drive or two-wheel drive; single or dual pneumatic tires. Leaning-wheel front axle. Weight, with scarifier attachment, 16,625 lb. Power controls provide quick, positive adjustments. Travel speeds from 1.7 to 13 m.p.h. Has wide blade reach for road shoulder work or backsloping. Detailed specifications are given in tabular form.—**J. D. Adams Co., Indianapolis, Ind.**

PLAN NOW..
FOR SUMMER
HEALTH and COMFORT
ON THE JOB!

M.S.A.
SALT
TABLET
DISPENSERS

Production as usual in hot summer weather, minus the bugaboo of "heat sickness", is found on the jobs where M. S. A. Salt Tablets are available! Three new and outstanding efficient M.S.A. Dispensers, ranging from the handy One-at-a-Time metal pocket unit through the "350" and "1500" Dispensers —made of corrosion-proof and breakage-resistant Bakelite, dustproof and weather-proof—provide in easy to take tablet form the salt necessary to replenish that lost from the body by profuse sweating. Write for the details on these positive Dispensers of one salt tablet at a time, *every* time!

M.S.A. SANITARY
PORTABLE DRINKING
FOUNTAIN

Cool, clean water—supplied under pressure from a sanitary "bubbler"—wherever the job may be! That's the net of this modern fountain, successor to the disease-spreading bucket and dipper. Quick-acting, positive bubbler saves time, avoids waste; insulated tank keeps cold water cool for hours, holding day's supply for average crew. Pressure is maintained by occasional strokes of the pump; *it is not necessary to pump while drinking.* Ruggedly built—may be attached to vehicle or carried by strap. Specifications on request.

ASK FOR BULLETIN No. FA-61, *containing full description of these interesting M.S.A. products.*

MINE SAFETY APPLIANCES CO.
Braddock, Thomas & Meade Streets, Pittsburgh, Pa.
District Representatives in Principal Cities

Brooklyn Monolithic Sewer

(Continued from page 46)

stripped in 60 to 72 hr. Invert was kept 120 to 200 ft. ahead of arch. Using these methods, the organization made the maximum progress of 240 ft. of sewer completed in one week and averaged 180 ft. per week.

Winter Work — With the advent of freezing weather, the contractor shortened the steel forms to 40 ft. and reduced the construction schedule to an average of 80 ft. of bottom and 40 ft. of top completed per week, barring storms. By this time the sewer had reached a section of shallow trench where the pavers could not chute concrete from the banks, and all concrete was placed by chute or crane bucket from a single paver sitting on top of the sewer.

To support the mixer, 10x10-in. steel H-posts were cast on 15-ft. centers in two interior walls of the four-barrel structure. Longitudinal lines of 12x12-in. timbers were laid on these posts to carry the paver and the cribbing placed under it to provide additional height for chuting concrete. An earth ramp on the roof of the sewer enabled batch trucks to back up to the mixer skip. Trucking was not allowed on the roof until concrete had reached an age of 30 days, and this provision required some juggling of work between separated sections of the sewer.

Specifications permitted concreting to start at 26 deg. F. on a rising temperature. Mixing water was heated in a kerosene heater. The sewer barrels and steel forms were closed off with tarpaulin curtains, and each form was heated with a coke-burning salamander. Fresh concrete was covered on the outside with salt hay and tarpaulins, and the forms remained in place a minimum of 5 days.

Overall Progress — Construction started Aug. 22. By Jan. 1 the contractor had used 94 working days, or 31 per cent of the 300 working days allowed by the contract, and had completed 69 per cent of the work. The job involves 24,000 cu.yd. of concrete and 2,000 tons of reinforcing steel. Maximum capacity of the sewer will be 4,116 sec.-ft., or nearly 2,700,000,000 gal. per day.

Administration — In charge of sewer design and construction for the Borough of Brooklyn, New York City, are Arthur J. Griffin, chief engineer of highways and sewers, and John H. Vogt, borough construction engineer. The Tomasetti contract is one of several projects being built under the supervision of William Moore, resident engineer for the Bureau of Sewers. John J. Kavanagh, inspector of construction, represents the Bureau on the job.

Contract value of the project under construction is $857,000. For the P. Tomasetti Contracting Co., Brooklyn, contractor, James A. Donovan is estimator and office manager, and Ralph Tomasetti is superintendent in charge of the work.

Serviceable Asphalt Plant

(Continued from page 48)

when material is to be stored. The liquefier is drawn from a tank above the mixer and is sprayed over the dry stone by a 1-in. perforated pipe, running across the top of the mixer, controlled by a stop valve within easy reach of the operator. Cutback oil is pumped to the storage tank above the mixer by the same pump that carries asphalt, it being necessary only to shut off a valve to the asphalt tank and open one to the oil tank. After the stone in the mixer has been coated with liquefier, the asphalt is dumped into the mixer by tilting the trough, spreading the material over the full width of the mixing hopper.

Mixer — Originally built for mixing dough, the mixer is a single-shaft, offset-wing, pug-mill type with tilting hopper or drum of 15-cu.ft. capacity. The revolving blades are set close to the drum. Being offset and turned at a slight angle, they throw the material back and forth and give it a thorough, rapid mix.

Although the mixer is heavy and strongly built, abrasive action of the stone has made it necessary to replace the steel shell around the mixing part of the drum with much heavier plate. The mixer operates at about 35 r.p.m. A complete charging and mixing cycle for one batch takes about 3 min.

Power Plant — Power to operate the plant is furnished by a Ford Model A motor, using the propeller shaft and one end of the rear axle and housing. Various countershafts and drive combinations are required to reduce or increase the speeds of the driven parts. Power transmission to the driven parts is by chain, except for the air compressor, which is belt-driven.

A power take-off back of the transmission case drives a countershaft, set directly above, which in turn drives the mixer and air compressor. On the end of the rear axle is mounted a sprocket which drives the dryer drum. A second sprocket mounted on the shaft of this drum drives a countershaft which operates the elevator.

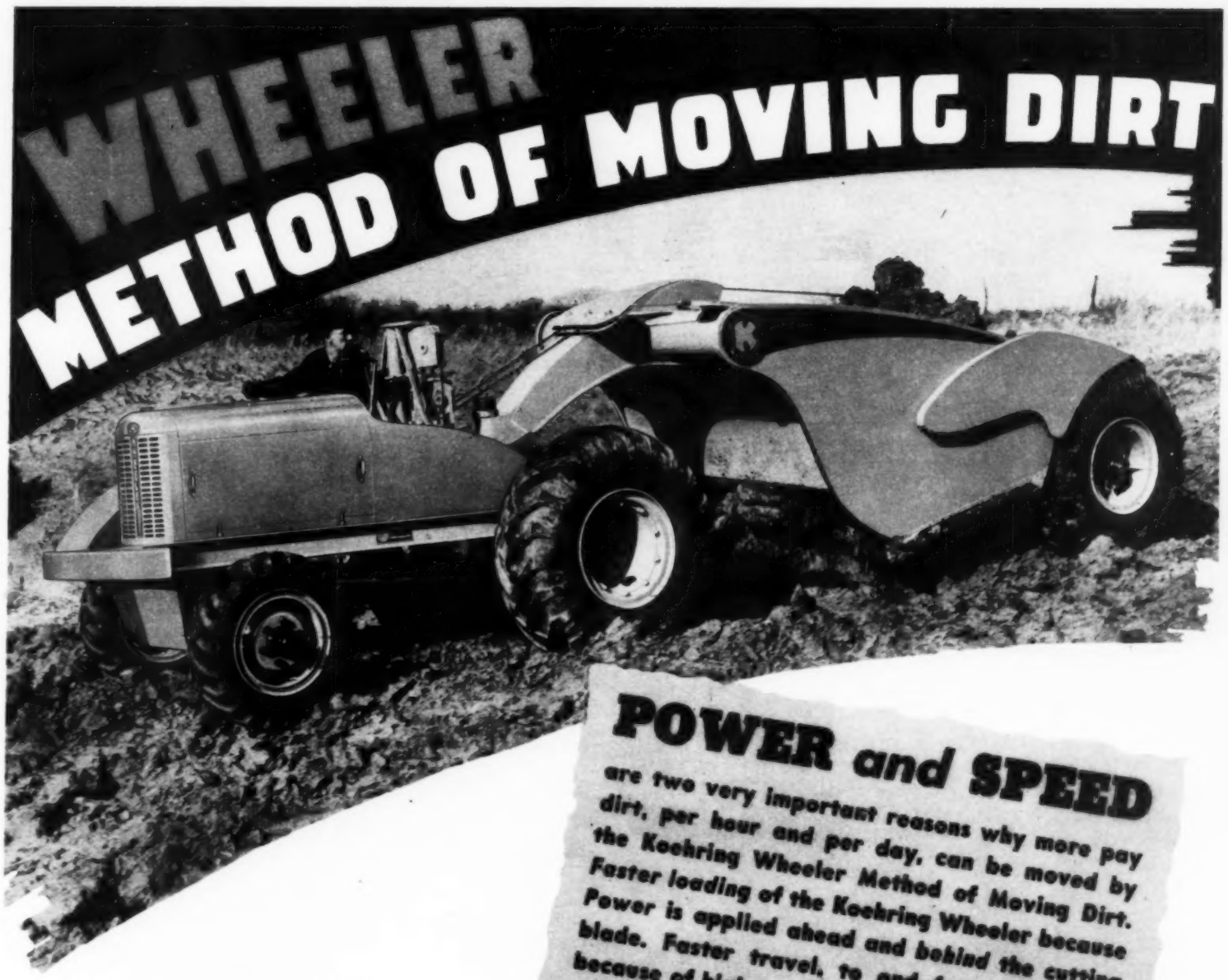
According to Mr. Chaplin, the driving mechanism could be greatly simplified by the substitution of two small electric motors for the present power plant. One motor could operate the drying drum and elevator, and the second motor could drive the mixer, eliminating all the chain and sprocket drives. The simpler arrangement would give greater flexibility in operation of the drying drum and would free the space under the mixer, where the power plant now is mounted, for storage of mixed material. At present, the storage bin has to be placed at the side of the plant.

Plant Structure—Dimensions of the plant proper are 8 ft. square by 30 ft. high, and the 20-ton storage bin over the truck driveway is 8x10 ft. Tower framing of the plant consists of 7-in. channels for the main members, with angle-iron bracing

(Continued on page 68)

KOEHRING

WHEELER METHOD OF MOVING DIRT



Controlled spreading and dumping because of movable front apron and possible 21" ground clearance of body when traveling.

POWER and SPEED

are two very important reasons why more pay dirt, per hour and per day, can be moved by the Koehring Wheeler Method of Moving Dirt. Faster loading of the Koehring Wheeler because Power is applied ahead and behind the cutting blade. Faster travel, to and from the dump, because of high speed Koehring Tractor . . . You should know about this newest method of dirt moving. Write today for more information.

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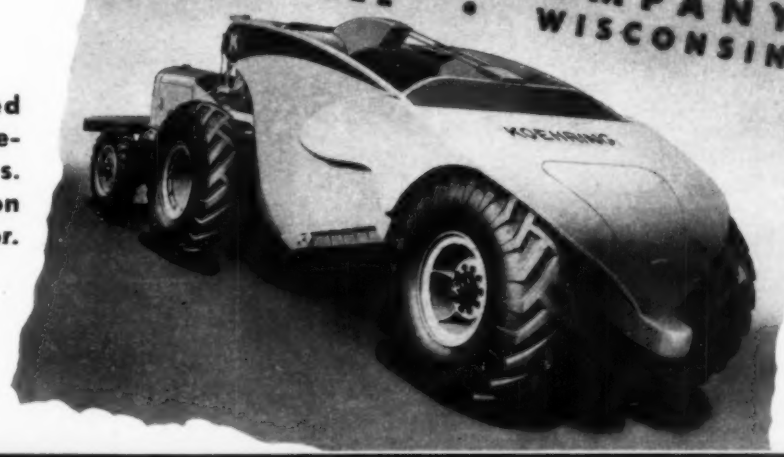

Streamlined for high speed travel. Simple cable arrangement with minimum of sheaves. Spring mounted push connection contacts the crawler push tractor.

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

New "RPM" (Diesel Engine) MAKES

RPM
REG. TRADE MARK
DIESEL ENGINE
LUBRICATING OIL

Outstanding "clean-engine" lubricating oil brings new service advantages to every type of Diesel engine.

ENTIRE DIESEL INDUSTRY BENEFITS!

New "RPM" DELO gives every Diesel operator — regardless of type or size engine — clean-engine operation, long peak-power performance, low maintenance cost!

STANDARD OIL

DELO
(Lubricating Oil)
DIESEL HISTORY

Climaxing years of persistent, "don't-say-no" laboratory and field research —rolling up over ten million test miles and over ninety thousand test hours—we now announce NEW "RPM" DELO—the outstanding lubrication contribution to the Diesel Industry.

Now—NEW "RPM" DELO brings to ALL Diesels the maximum service benefits of correct lubrication!

Now—regardless of size or type of Diesel equipment—in the plant, in the field, on the road, aboard ship, on any job—regardless of service conditions, and regardless of job location—now—NEW "RPM" Diesel Engine Lubricating Oil (in proper S. A. E. grades) does the same complete lubricating job for ALL Diesel Engines!

Forget horsepower, forget design, and forget your past lubrication problems. Now—NEW "RPM" DELO brings you unequaled assurance of clean-engine operation—free rings, clean pistons, unclogged filters, unscratched liners, uncorroded bearings, and a new low in cylinder and ring wear. Remember—any Diesel engine, any time, anywhere! Think! Worry-free break-ins, fewer overhauls, less repair stoppage, long peak-power performance! And that goes for every Diesel, every time, everywhere! Your engines included!

Ask our Representative or your nearest Distributor to see the Engineers' Report on New "RPM" DELO—complete test data that prove its unequaled performance conclusively. Then, give YOUR Diesel equipment this maximum power protection! Wherever you are—whatever Diesel you operate—NEW "RPM" DELO WILL LUBRICATE IT!

New "RPM" Diesel Engine Lubricating Oil — now available everywhere in the gray barrel with the blue head.

Order from your nearest distributor listed below

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STANDARD OIL COMPANY (Indiana)
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Kyso "RPM" Diesel Engine Lubricating Oil:
STANDARD OIL COMPANY
(Inc. in Kentucky)

Signal "RPM" Diesel Engine Lubricating Oil:
SIGNAL OIL COMPANY

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"RPM" Diesel Engine Lubricating Oil:
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"RPM" Diesel Engine Lubricating Oil is also available through distributors in more than 100 other countries.
Get in touch with your nearest distributor —for a clean engine, and long hard service with the minimum of overhaul.

COMPANY OF CALIFORNIA

40 MILLION CU. YDS. POURED show why it pays to build with JAEGER *Truck Mixed* CONCRETE

WILL CUT COSTS UNDER ANY OTHER METHOD ON ROAD WIDENING (Ideal for Use with New Jaeger 4-6 Ft. High Speed Widening Finisher)
FOR ROAD WIDENING OR SLAB

RECOGNIZED HIGHER STRENGTH—EASIER WORKABILITY

REAL SAVINGS IN YOUR COST OF PLACEMENT

MOBILITY - FLEXIBILITY - EFFICIENT OPERATION

Increasing thousands of contractors are learning why it pays to build with Jaeger Truck-Mixed Concrete. Jaeger's exclusive End-to-End Reversing "Re"-Mix, and Faster, Continuous-Flow Discharge result in a recognized higher strength concrete that is free from segregation and easier to work into the forms—preferred by architects, engineers and contractors. This, plus many operating advantages, based on mobility and flexibility of plant and tremendous placement savings, explains why MORE THAN HALF THE TRUCK MIXERS SERVING JOBS TODAY ARE JAEGERS.

Jaegers are Built in 1 to 6 Cu. Yd. Sizes. Send for new Catalog TM-39 showing how Jaeger Truck Mixers meet jobs like yours.

THE JAEGER MACHINE CO. 800 Dublin Ave. COLUMBUS, OHIO

(Continued from page 64)

and wood siding. A separate frame of 6-in. I-beams, bolted to the main frame, carries the power plant and the dryer. The entire plant is bolted to facilitate dismantling and moving, and the dryer can be detached, if desired, and operated independently.

Full credit for mechanical work in constructing the plant is given by Mr. Chaplin to Orlie Fay, garage mechanic. Shop equipment in the Morgantown garage consists of one drill press, one portable electric drill, one small bench emery grinder and one cutting and welding outfit.

Sheetpile Bulkhead *Under* *New Jersey Bridge*

(Continued from page 61)

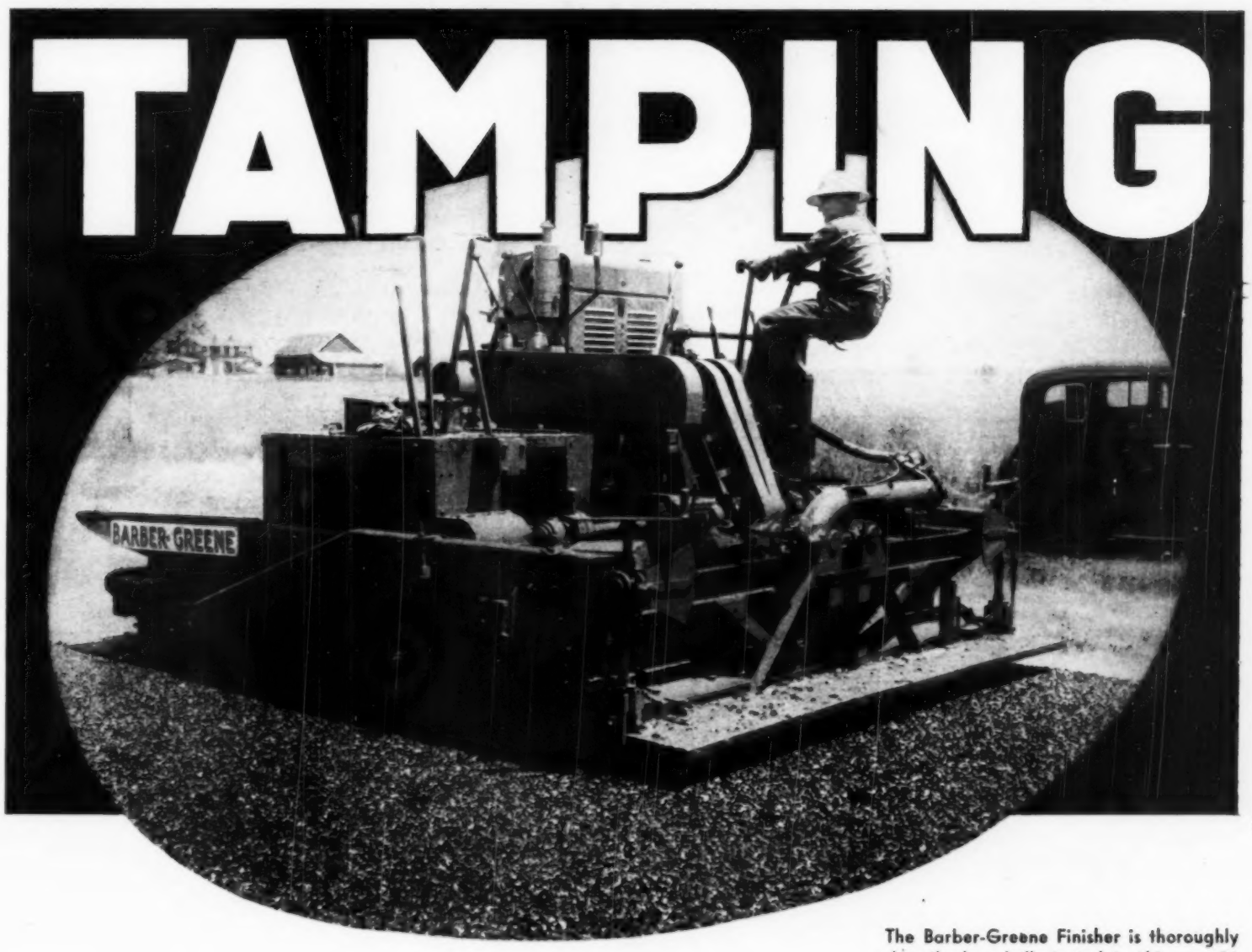
about 6 ft. Jacking was tried first, but this method proved to be very slow. A cable sling was hung from two of the piles and the hammer set in the sling so that the anvil plate rested on the cable. By driving on the sling the two sheets were lowered so that the hammer could be set on top. All handling of the hammer under the bridge was by one or more of the chain blocks. When hard strata of material were encountered in driving, a water jet was used to assist the hammer.

A plan was soon evolved for starting the sheets to make room for the hammer. After a pile had been driven half way it was keyed to the adjoining one. This connection was accomplished by cutting a slot in the two sheets through the interlock and inserting a steel plate or key. Hammering then was resumed on the lower sheet, and by the time it had been driven home the next pile was lowered sufficiently to receive the hammer.

Concrete Fill—Arms of the new bulkhead were extended beyond the ends of the abutment pier and returned to meet the existing bulkheads at either side. The space between the sheeting and the face of the pier was then filled with concrete without attempting to remove the water. Concrete was poured to a point above low tide by means of a hopper and tremie pipe, using a rich mixture. From this point to the top of the wall, the concrete was poured in the open. Concreting started shortly before the river reached the low-tide level and was completed well ahead of the rising tide.

Supervision—Work was performed under the direction of Otis R. Seamen, county engineer of Monmouth County, in accordance with a plan prepared by Morris Goodkind and Ash-Howard-Needles & Tammen. Grover C. Denney superintended the work for the contractor, the Merritt-Chapman & McLean Corp., Baltimore, Md. The P.W.A., which financed the bridge through a combined loan and grant, maintained its customary supervision over the work.

TAMPING



ONLY the Barber-Greene Finisher *Tamps*. Only *Tamping* gives uniform compaction. Only uniform compaction assures a permanently smooth surface.

The ingenious and greatly superior Leveling Principle of the Barber-Greene would be practically worthless if the Finisher used the common method of merely "striking off" the material. Subsequent rolling and traffic would compact the material more in the thicker portions, and less in the thin, reflecting subgrade irregularities in the top surface.

The Barber-Greene *Tamps* and Levels simultaneously, automatically compacting more material into the depressions. *Even if forms are specified, Barber-Greene Tamping is essential, if the surface is to stay level under rolling and traffic.*

***Tamping* allows the Barber-Greene to lay stiffer, less workable mixes. *Tamping* kneads and compresses the material into place. *Tamping* not only compacts, but the vibration interlocks the fine particles. *Tamping* greatly reduces rolling, and eliminates local depressions that the roller bridges. *Tamping* simplifies matching joints, as both the old and the new mats are in their compacted states. *Tamping* is not just a theoretical advantage. Hundreds of miles of work throughout the country prove it — all Barber-Greene owners confirm it. We urge you to ask them. Barber-Greene Company, Aurora, Illinois.**

The Barber-Greene Finisher is thoroughly described and illustrated in this new 36 page booklet. It comprehensively covers Principles, Accomplishments, and Important Features. You should add the interesting contents of this booklet to your present knowledge. Write for your copy, there is no obligation.

39-4

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Leveling-Tamping FINISHERS
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With Buyers of Shovels it's ABW!

SINCE 1774
The Famous Armor-D Handle — there is no wobble to an Armour-D.
Electric welded front straps on plain backs which are tear proof.
The finest of shovel steel made by a special continuous rolling process feature ABW Shovels.
The Famous Ames Bend gives perfect balance.
The ABW Shock Band makes handle stronger.
Die Pressed Labels which cannot come off or become mutilated.
There are more ABW Shovels sold than any other make. Year in and year out, from the Miner who buys his own shovel to the big buyer of shovels, this preference is sustained. The reason for this is obvious when you consider that for one hundred and sixty-four years "Ames" Shovels have been the leaders. And look at the revolutionary and exclusive features which distinguish ABW Shovels.
The prestige of a firm is reflected in its product. When you buy ABW Shovels you can feel secure that you are getting the best in design, materials and workmanship — the result of one hundred and sixty-four years of shovel making experience.
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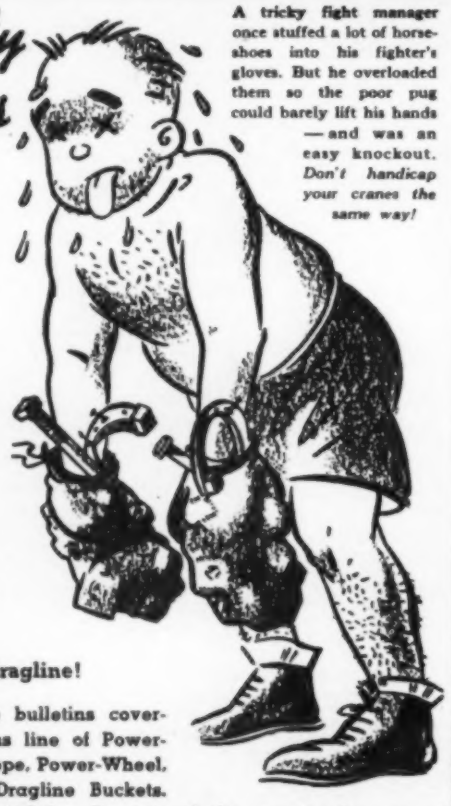
Cranes Take Fast, Hefty Swings with a Williams Bucket on the Boom!



A tricky fight manager once stuffed a lot of horseshoes into his fighter's gloves. But he overloaded them so the poor pug could barely lift his hands — and was an easy knockout. *Don't handicap your cranes the same way!*

★ Cranes have limits in lifting power and digging radius. Hanging TOO big a bucket on the boom often defeats its own purpose!

You want FAST digging, and BIG payloads — and Williams Buckets help you get the best performance from your cranes because Williams welded construction and design eliminate excess weight without sacrificing digging power or durability! You get the most out of your cranes with the right Williams Bucket on the boom or dragline!

Send for free bulletins covering the Williams line of Power-Arm, Multiple-Rope, Power-Wheel, Hook-On and Dragline Buckets. Distributors located in all parts of the country for prompt field service.

THE WELLMAN ENGINEERING CO.
7017 CENTRAL AVE. CLEVELAND, OHIO

WILLIAMS *Buckets built by* WELLMAN

Vehicular Tunnel Roadway

(Continued from page 57)

total of 5,500 sq.yd of paving, requiring the use of 46,000 precast blocks. Pavement was laid on one-half of the roadway at a time for the entire length of the tunnel, leaving the second lane clear for movement of equipment and materials.

After priming the concrete base and the steel plates covering the drainage channels by spraying with cutback asphalt, the contractor placed a 1-in. sand-asphalt bedding course struck off to a smooth surface by a rolling screed riding at one end on the curb and at the other end either on the base or on the completed surface, depending upon

TONGS are used to lift and replace blocks which are low or unsatisfactorily bedded.

whether the first or second lane was being constructed. To reduce irregularities in the sand-asphalt cushion, the wheels of the strikeoff were mounted on long side beams. After screeding, the cushion was tested for depressions with a 10-ft. straight-edge.

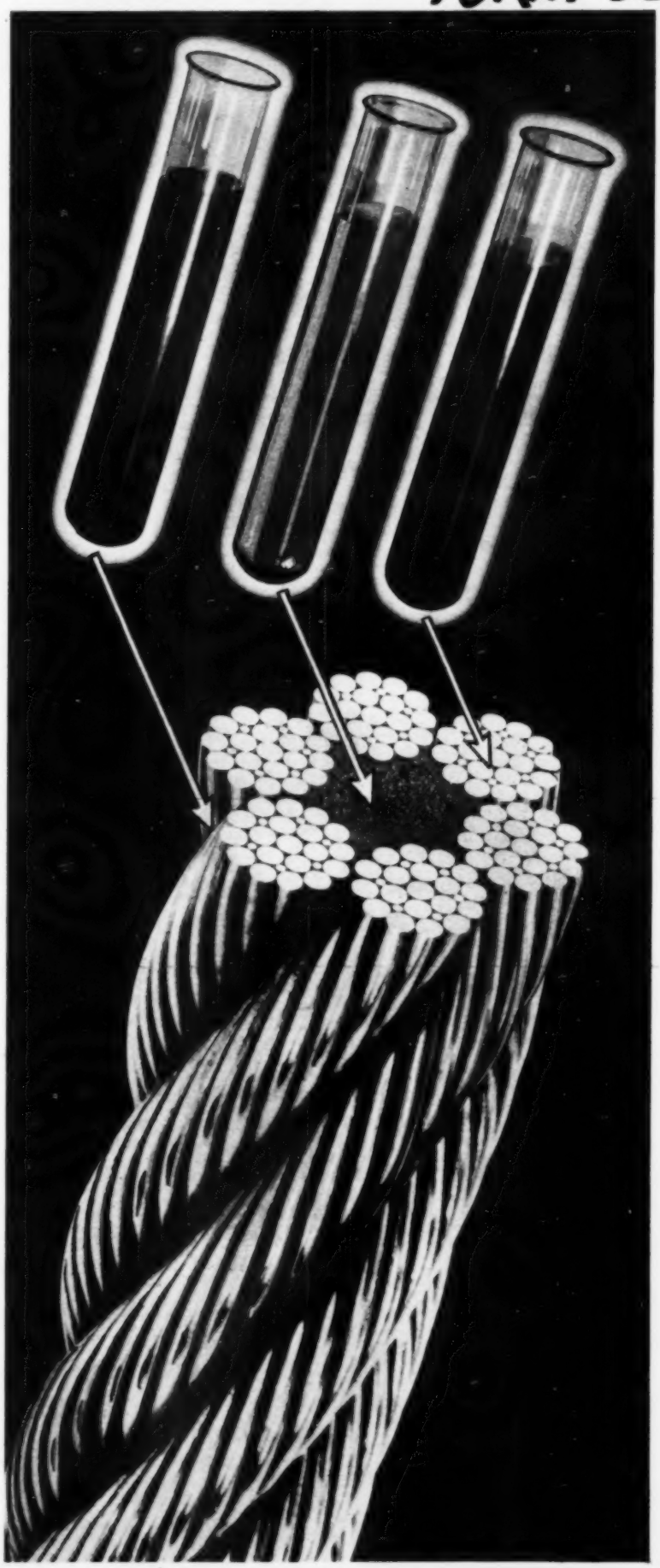
Precast Paving Blocks—Precast exposed-aggregate concrete paving units were laid on the cushion. Paving blocks used in the tunnel resembled the patented paving units of the Ultimite Paving Block Corp. of America and were included in the Port Authority's specifications to assure competition with the patented product in the bidding. Pavements surfaced with the Ultimite type of precast units in 1934 and 1935 and subjected continuously to heavy traffic since that time were inspected by Port Authority engineers before this class of paving was selected for the 178th St. tunnel. Blocks actually used in the tunnel were manufactured under subcontract for Frank Mascali & Sons, Inc., by Mahlstedt Materials, Inc., New Rochelle, N. Y., at the manufacturer's Bronx yard, using a procedure similar in many respects to the patented Ultimite process.

At the Mahlstedt yard, the blocks were cast in rubber-bottom steel-wall flat molds, using a rich concrete with ¾-in. trap rock as the coarse aggregate. Concrete was vibrated in the forms to give it additional density and strength. The blocks were placed immediately in a steam curing chamber for 16 hr. and then were turned out of the molds to permit brushing of the mortar from the face which had been placed against the rubber pads, exposing the trap rock and providing a durable, non-skid

(Continued on page 74)

PURPLE-STRAND *FORM-SET* WIRE ROPE

BETHLEHEM Specify FORM-SET PRE-FORMED ROPE



3 lubricants scientifically compounded

In wire rope, proper lubrication of every part is essential to longer life. Only in this way can internal friction be cut down and the closely fitted, precision-made parts protected against corrosion and destructive internal wear.

But ordinary oil or grease cannot serve in heavy-duty rope. Nor could a single type of oil properly lubricate the 100 to 400 moving parts of a line. To overcome these conditions, Bethlehem uses three different lubricants. Each one is specifically compounded for a section of this type of cable. One lubricant keeps the hemp in the core soft and pliable. A second, used for the strands, stays in this compact group of wires and gives them lifetime protection. A third is compounded for the rope as a whole and is built in while the strands are brought together. It serves to seal out moisture and minimize friction between strands as they twist, bend and slide under bending and load.

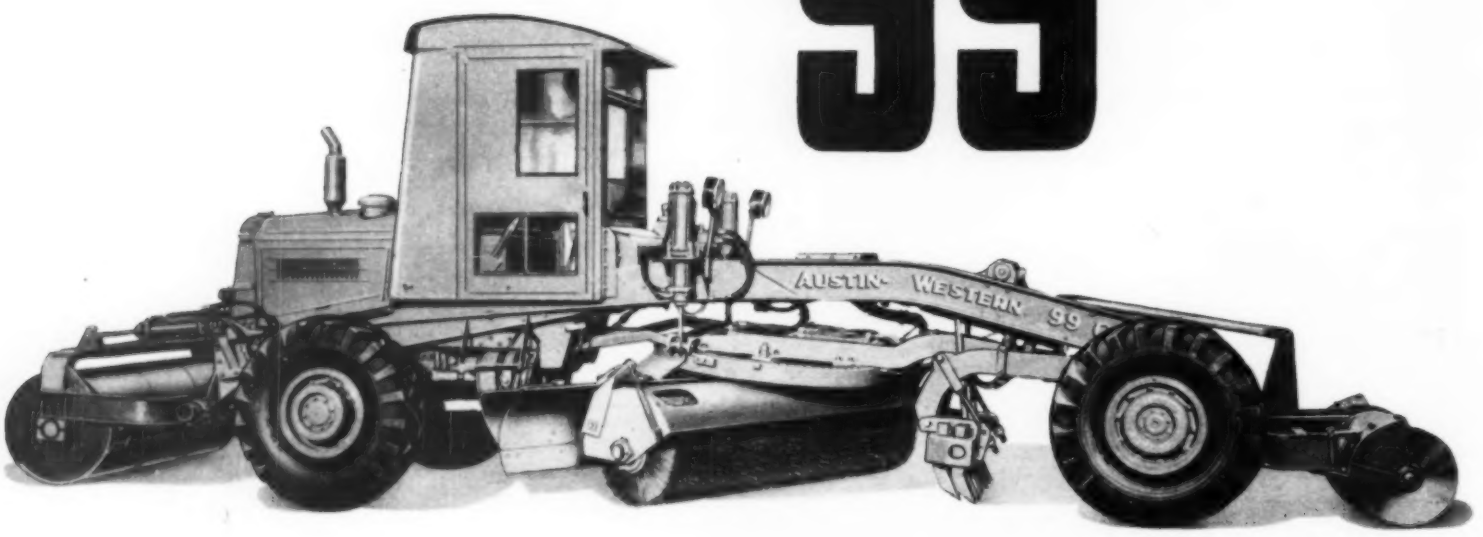
This special, built-in lubrication is one of many reasons why Purple-Strand Form-Set is so satisfactory in service. A precision method of drawing wire is another. The use of only premium-priced steel is a third. In every detail, Purple-Strand quality is the result of long study, precision design and careful workmanship. Equally important is the fact that every step in the manufacturing process is under the supervision and control of one integrated organization.

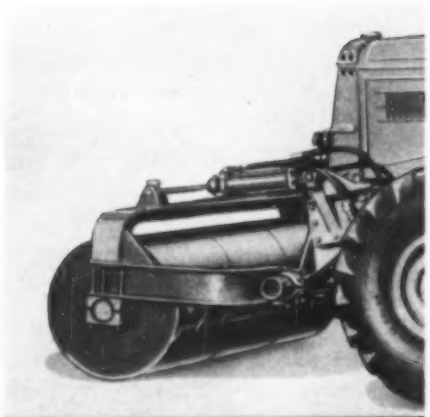
BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

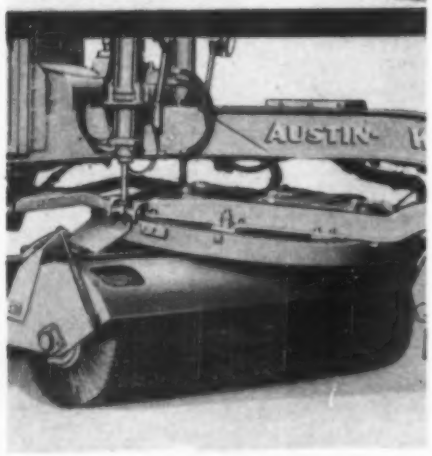
NEVER AN IDLE

FOR THE AMAZINGLY VERSATILE A-W "99"

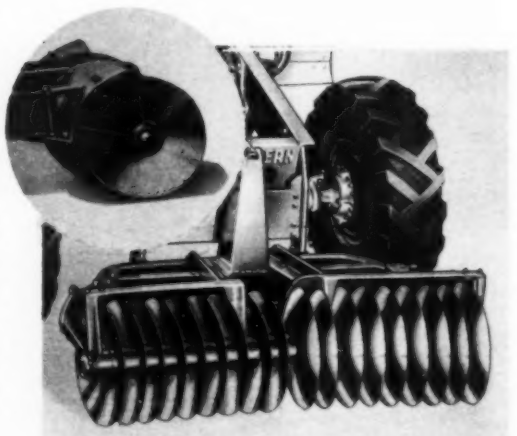




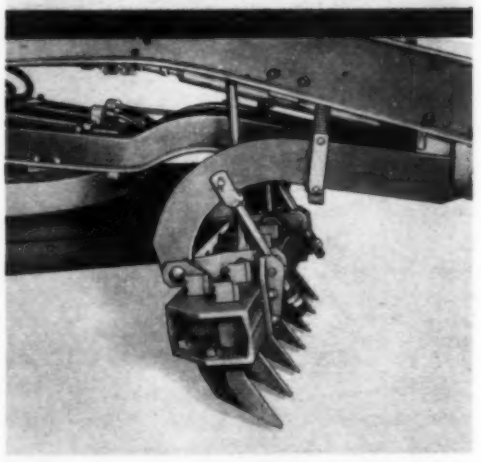
REAR ROLLER . . . Put to work instantly, or elevated out of the way so as not to interfere with other grader operation. Hydraulically controlled from cab, and provides a range of compression from zero up to 475 lbs. per lineal inch. When operating conditions lift rear wheels of the grader off the ground, there is ample power and traction in the front wheels of the "99" to meet various rolling requirements.



POWER DRIVEN ROTARY BROOM . . . Attaches directly to the "99" blade, taking full advantage of its speedy, hydraulically-controlled up and down, circular and side shift adjustments. Broom can be set at any angle to sweep to the right or left, can be raised or lowered to secure the proper pressure for any condition, and can be side-shifted either way without affecting sweeping angle or broom pressure.



DISK HARROW . . . This extremely rugged, two-gang attachment is especially suited for discing old black top roads and heavily sodded shoulders, for mixing stabilized road material, and for use wherever rough surfaces or clods must be broken up or leveled. By utilizing the extra power and traction of the "99" All-Wheel Drive and Steer operator can do a better job and make substantial time savings.



SCARIFIER . . . Sheet asphalt, paving brick, bituminous concrete and traffic-bound macadam or gravel are easier to tear up with this hydraulically controlled scarifier utilizing the "99's" extra power and traction. When scarifier is raised, hinged block causes tines to fold up . . . affording extra clearance. Both the straight and V-type Scarifiers are available.

MOMENT

● Now the EXTRA money-saving possibilities of the A-W "99" have been substantially expanded by three new low-cost, easily-installed attachments . . . (1) Rear Roller; (2) Power Driven Rotary Broom; (3) Disc Harrow.

These PLUS uses . . . eliminating the necessity of investing in a battery of costly auxiliary outfits . . . are made possible by the "99 s" extra power, maneuverability, and simplicity of operation. Driving on all four wheels, the "99" can always apply power exactly where you need it for a wide variety of jobs and under a wide variety of conditions. Front and rear steer enables the operator to put his wheels where he can get the best traction. An operating advantage no other motor grader can supply.

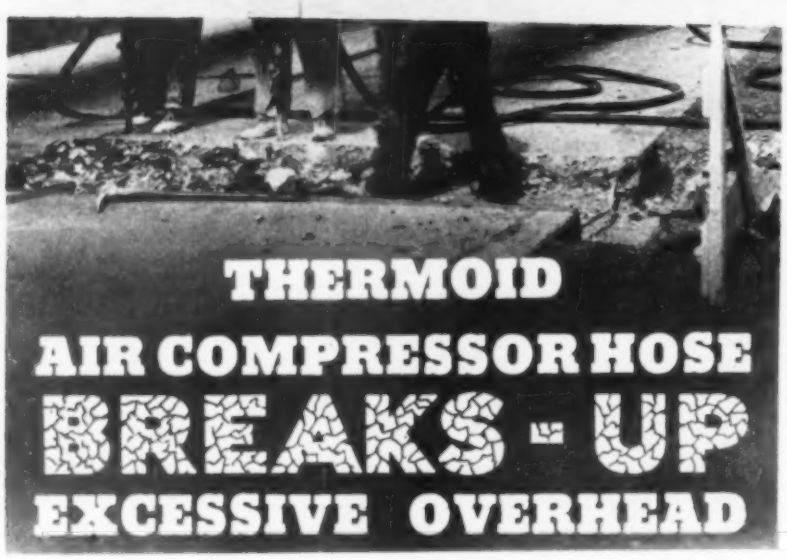
A "99" never has to be supported in idleness for long periods. It does everything you could possibly ask of a superpowered motor grader; and, in addition, it can be used as a scarifier, roller, broom, harrow, bulldozer, backsloper, snow plow, and for pulling other types of equipment . . . with a minimum investment in equipment. That's why so many "99" owners say this versatile machine would be a "smart" buy at much more than its actual cost.

BULLDOZING

PULLING A GRADER

BACK SLOPING

The AUSTIN-WESTERN
ROAD MACHINERY CO., Aurora, Illinois



. . . On Any Construction Job!

Regardless of the job . . . wherever you find Thermoid Air Compressor Hose at work, you'll find an operator who has found the best answer to lowered costs . . . uninterrupted service and long hose life.

Thermoid Air Compressor Hose is constructed with an oil-proof inner tube, reinforced with plies of tightly woven, non-expanding cotton fabric. Between the carcass of the hose and the outer cover is a ply of cotton braid to increase the adhesion. The outer cover is pure gum rubber for greatest resistance to abrasion.

Thermoid Air Compressor Hose will work under pressures up to 200 pounds and is available in ½, ¾ and 1 inch sizes in both 25 and 50 foot lengths. Couplings supplied or attached, if specified. Thermoid Rubber, Division of Thermoid Company, Trenton, N. J.

Thermoid

BELTING ★ PACKINGS
HOSE ★ BRAKE LININGS

(Continued from page 70)

surface. Curing under moist conditions continued for 28 additional days.

Specifications required that the blocks have a modulus of rupture of not less than 700 lb. per square inch in 28 days. Compressive strength of the blocks of the same age was about 10,000 lb. per square inch. A 4-in. block, 11¾x11¾ in. in surface demensions, weighs about 50 lb.

Rolling and Joint Filling—Joints in successive rows of blocks were staggered by starting alternate courses with half-blocks. The blocks were bedded in the cushion by rolling with a 5-ton tandem roller on 1-in. boards, the boards serving to distribute the pressure and produce a uniform surface. Pavers laid the blocks by hand, with ¼-in. open joints between adjacent units. The joints were filled within 24 hr. with hot asphalt. In replacing blocks which were low or unsatisfactorily bedded, the workmen handled the units with tongs.

Before applying the joint filler, the contractor sprayed the top surface of the blocks with a calcium chloride-starch-water solution which prevented adhesion of asphalt to the top of the pavement. Hot asphalt then was poured into the joints by means of pouring pots. After the asphalt had cooled, excess material was scraped from the surface with hot ice cutters and was returned to the kettles.

Traffic Line—A permanent traffic line was built into the pavement by laying contrasting white-cement paving blocks in alternate courses along the center line of the roadway.

Administration—Tunnel paving was carried out under the immediate supervision of R. F. Wheadon, resident engineer, in charge of all work on New York approaches to the George Washington bridge for the Port of New York Authority, of which O. H. Ammann is director of engineering, J. C. Evans is chief engineer, and C. S. Gleim is engineer of construction.

To aid Frank Mascali & Sons, Inc., general contractor, Bronx, N. Y., in building a first-class pavement with precast concrete blocks, the Ultimite Paving Block Corp. of America, New York City, lent a paving crew headed by its general superintendent, Fred Hess, who directed the paving work.

Improvised Cinder Spreader

(Continued from page 46)

a hopper fashioned from an old oil barrel. Hinged slides are fastened to the bottom of a steel plate 15 in. wide, which supports the hopper 4½ in. above the rotating disk. Accompanying photographs illustrate these details.

To act as an agitator for breaking up clinkers or frozen chunks, a piece of 2-in. pipe 16 in. long, flanged and bolted to the center of the revolving disk, extends up through the center of the hopper. Three ⅝-in. holes are drilled through this pipe about 3 in. apart, staggered. Rods are put through these holes and are welded in place. The bottom rod extends about 1½ in. and the top rod about 2 in. from the pipe.

It is necessary to feed this type of spreader by hand because the hopper is too high to permit dumping directly into it. According to Mr. Chaplin, hand shoveling means no additional expense because two men always travel with the truck to speed loading from stockpiles.

WHY DO WE EMPHASIZE MEVAC CONTROL ?

Because dependable performance . . . the year around . . . is a first consideration when you buy an excavator.

You can take the Clipper North, South, East or West . . . anywhere in the world . . . to high elevations or low . . . in Equator heat or Arctic cold . . . dry weather or wet . . . its smooth, positive operation is not affected . . . and condensation never collects in its control lines.

Figure that in terms of increased yardage . . . then you know why we emphasize MEVAC CONTROL.

YOU GET IT ONLY ON

Buckeye Clipper

CONVERTIBLE EXCAVATORS

1/2 YARD
5/8 YARD
3/4 YARD

SHOVEL
CRANE
CLAMSHELL
TRENCH HOE
DRAGLINE
PILE DRIVER

ON-CLOGGING
SELF-CLEANING
CRAWLERS

PATENTED AND MANUFACTURED BY
THE BUCKEYE TRACTION DITCHER COMPANY, FINDLAY, OHIO.
BUILDERS OF
DITCHERS AND TRENCH EXCAVATORS • BACKFILLERS •
HIGHWAY WIDENERS • R-B FINEGRADERS • SURFACE MATERIAL SPREADERS
EARTH HANDLING AND ROAD BUILDING EQUIPMENT FOR OVER 40 YEARS

MAIL THIS COUPON NOW

Send at once complete information and prices on . . .

☐ SHOVEL ☐ DRAGLINE ☐ TRENCH HOE ☐ CLAMSHELL
☐ CRANE ☐ PILE DRIVER ☐ 1/2 Yard ☐ 5/8 Yard ☐ 3/4 Yard

NAME _____

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CITY _____ STATE _____

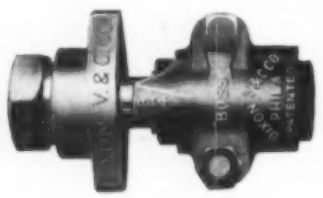
FOUR OF A KIND *in Quality and Performance!*

"DIXON" AIR HAMMER COUPLINGS

These are the couplings contractors buy when they want to insure dependability at minimum cost, for all makes of hand hammers and rock drills. Simple construction . . . superior strength and durability . . . easily installed. Cadmium plated to prevent rust. Compact type Style WLD-7, ½" and ¾"; heavy type—style WHD-9, ¾" and 1".

"GJ-DIXON" Ground Joint AIR HAMMER COUPLINGS

The most efficient couplings ever devised for air equipment. No leaking or lost washers. Soft-to-hard metal contact forms permanently tight seal, regardless of wear. Unusually strong and durable. Cadmium plated — rust proof. Furnished with either male or female spud. Style XLD-41, ½" and ¾"; style XHD-52, ¾" and 1".



"GJ-BOSS" Ground Joint AIR HAMMER COUPLINGS

Except for stem and clamp, these couplings are exactly the same as the "G J — DIXON" Air Hammer Couplings described above. The alloy steel stem of the "G J — BOSS" has a collar to accommodate the grip of the extending fingers of the sturdy malleable iron "BOSS" Clamp.

"BOSS" AIR HAMMER COUPLINGS

Generally, these are the same in design and construction as "DIXON" Air Hammer Couplings with the same steel spud and malleable iron wing nut. Like the "G J — BOSS", however, they are equipped with the extra strong malleable iron "BOSS" Clamp, the fingers of which engage a collar on the alloy steel stem.

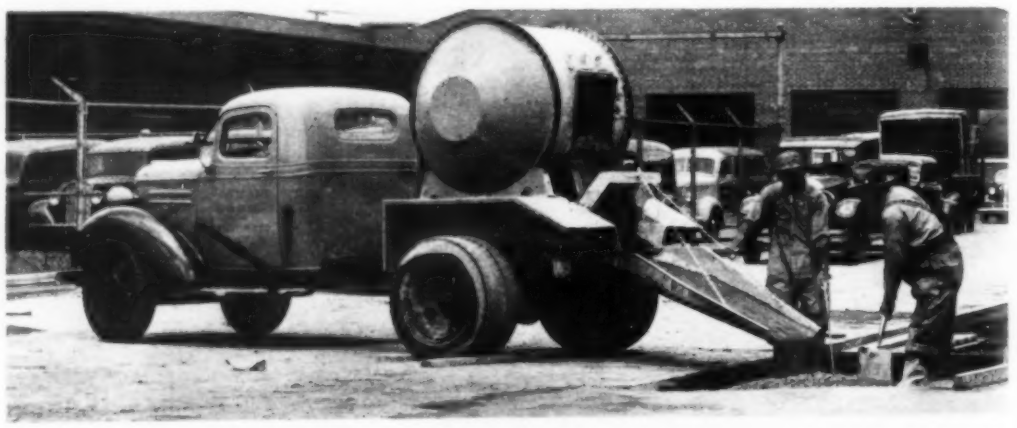
Both "BOSS" and "G J — BOSS" Air Hammer Couplings are used for the most severe types of service, where absolute safety is essential. Application of the "BOSS" Clamp, with its tenacious grip, eliminates all possibility of blow-offs.

Stocked by leading rubber manufacturers and jobbers

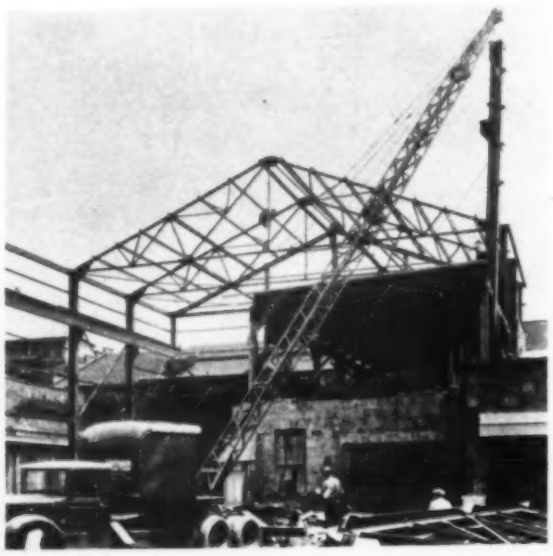
DIXON
VALVE & COUPLING CO.
MAIN OFFICE AND FACTORY
PHILADELPHIA
BRANCHES: LOS ANGELES • BIRMINGHAM • HOUSTON

CONSTRUCTION EQUIPMENT NEWS

OSCILLATING SHEEPSFOOT ROLLER, designed for better, faster and more economical operation, has 3½-ft.-diameter drum sections 5 ft. long hinged together to allow oscillation and easy flexibility, thus permitting rollers to follow contour of uneven ground and give uniform compaction to all points. Unusual hinging permits any drum in roller to be interchanged with any other drum, making it easy to convert two-drum roller into four-drum unit and vice versa. Tapered tamping feet, 8 in. long, are of special design which permits stronger base construction and reduces clogging of feet. Because of shape, feet are said to enter new fill material easily, to give maximum compaction and to pull out of ground without kicking or tearing up newly rolled material. Larger size drums give greater tamping width and reduce number of passes necessary for compaction. — **R. G. Le Tourneau, Inc., Peoria, Ill.**

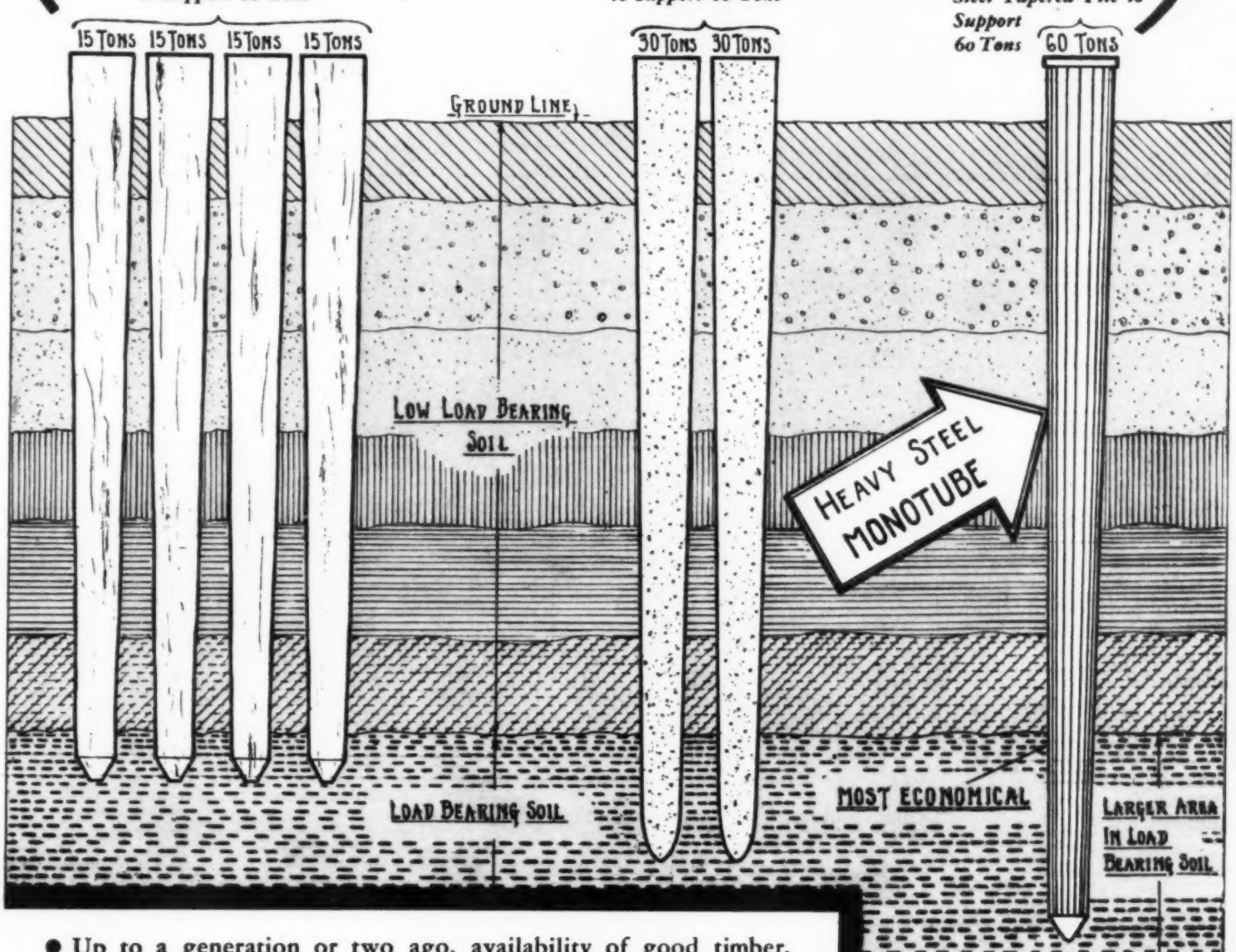


TRANSIT MIXER, 1½-yd. capacity, for mounting on any light truck, has drum which can be rotated by truck motor through power takeoff. Drum rotates either forward or reverse and can be stopped in any position. At truck speed of 20 m.p.h., drum rotates six to eight times per minute. Drum may be rotated with truck standing still. When a derrick or crane is used on job, drum may be lifted off truck and used as bottom-dump bucket. Mixing unit may be detached from truck chassis at any time when truck is needed for other purposes. Shipping weight, 2,210 lb. — **Lee Transit Mixer Corp., 615 Circle Tower, Indianapolis, Ind.**



HEAVY-DUTY TRUCK-MOUNTED CRANE has been designed especially for steel erector and rigger, sewer contractor and bridge builder. Capacity, 26,000 lb. at 10-ft. radius in all directions, with outriggers set, and without outriggers will handle 23,300 lb. over back and 21,700 lb. over side at 10-ft. radius. Equipped with all-welded boom made in basic 25-ft. length consisting of two 12½-ft. sections. Center sections available to extend boom to maximum length of 80 ft. and tip extensions to supply lengths up to 110 ft. or longer. New boom of pin-connected design, each splice formed by four clevis and pin connections. No bolts at splices, but instead four pins to give strong, rigid splice. Another feature is boom lacing formed of single continuous bent angle running full length of each boom section — developed to give maximum strength at minimum weight. Boom derricking and lowering both power controlled. Special precision boom hoist, operating through positive ratchet and pawl on end of hoist shaft, gives positive power control of boom lowering operations through wide range of lowering speeds. — **The Thew Shovel Co., Lorain, Ohio.**

Evolution of Pile FOUNDATIONS

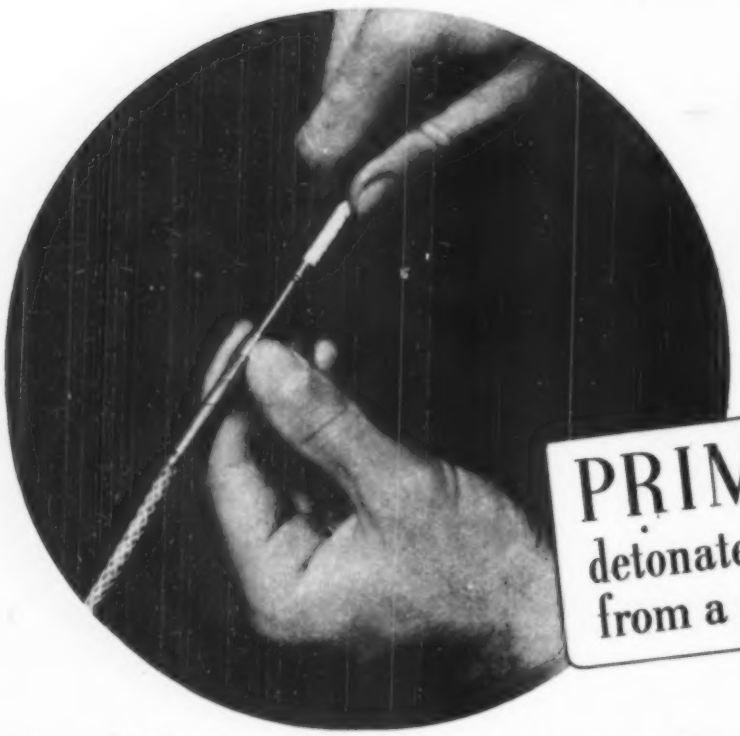


● Up to a generation or two ago, availability of good timber, low cost of transportation and field labor, justified the use of 4 Wood Piles—in spite of their driving limitations—to support a foundation load of 60 Tons.

Depletion of sound timber, increasing costs and stricter requirements of permanence brought about the development of Concrete Piles of greater load-supporting ability, replacing 4 Wood Piles with 2 Concrete Piles to support the same foundation load.

And now—ONE MONOTUBE, heavy steel, cold rolled tapered pile, can be driven with assured safety to depths in high load-sustaining soil strata, (filled with concrete after driving), to actually develop a load-supporting value of 60, 80 or even 100 Tons with ample factor of safety and AT LESS COST. *Write for Catalog No. 68*

The UNION METAL MANUFACTURING CO.
Canton, Ohio



PRIMACORD
detonates entire blast
from a single cap

Primacord-Bickford Detonating Fuse can be set off by means of fuse and cap or electric blasting cap. In either case, *this one cap is the only cap required for the entire blast.* It is attached after all holes have been loaded and tamped — after all connections have been made — after all equipment and lines have been removed — after all men have gone to a place of safety. The cap detonates the Primacord. The Primacord detonates each and every cartridge in the blast — whether there is one hole or a thousand.

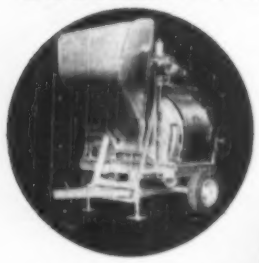
Primacord has greatly broadened the field for detonating fuse — as you will see when you read the Primacord Booklet. May we send you a copy?

THE ENSIGN-BICKFORD CO., Simsbury, Connecticut
Makers of Cordeau-Bickford Detonating Fuse — and Safety Fuse Since 1836

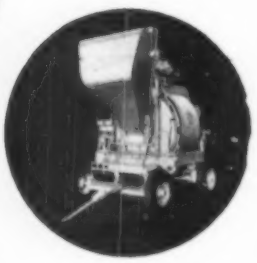
PB7

PRIMACORD-BICKFORD *Detonating Fuse*

C. M. C. — AMERICA'S No. 1 EQUIPMENT LINE FOR 1939!



New CMC fast moving, high production two-wheel End Dischargers to 5s, 7s, 10s and 14s sizes.

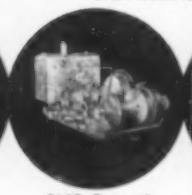


New CMC 14s, 4-Wheel End Discharger. Large output, fast, lighter weight. Also available in 7s, 10s.

New CMC 4-Wheel Side Discharger. Another big output Mixer, available in 5s, 7s, 10s and 14s sizes.

New Catalog Ready! Bigger and better than ever. Write today.

CMC Dual Prime Pumps.



CMC General Utility Hoists.

CMC Material Carts.

CONSTRUCTION MACHINERY CO.
WATERLOO, IOWA

"MAYBE I SHOULD'A CHECKED THOSE STRINGS WITH A MARTIN-DECKER TENSION INDICATOR!"

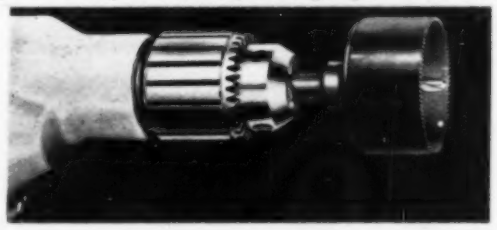
No matter what your particular tension problem may be, there's a Martin-Decker Tension Indicator that will quickly and accurately measure the actual load on your lines *in the field* . . . without paper calculations and without dead ending!

Just clamp it on the line and read the dial (no wrenches needed). It'll not only catch the steady pulls, but also those surging impact loads that are almost impossible to calculate. With the information it gives, you can get longer life, greater safety, from your lines . . . cut replacement costs to the bone!

Three sizes, for lines from 3/16" to 2¼" diameter, all adjustable for temperature changes. Write today for full information. Ask also about the Martin-Decker Measuring Line Weight Indicator.

MARTIN HOME OF THE TENSION INDICATOR **DECKER CORP.**
LONG BEACH, CALIFORNIA

HOLE SAWS developed to cut faster and to retain sharp cutting edge for longer time are made in one piece of 18 per cent Tungsten high speed steel and

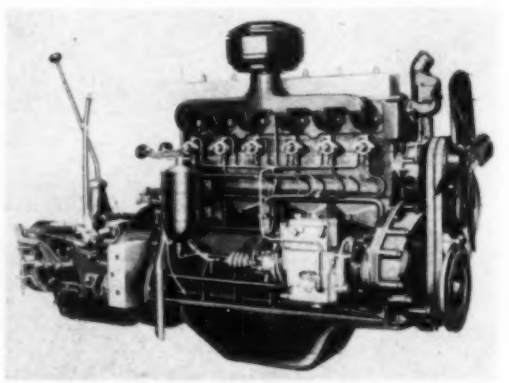


in diameters from ¾ to 3½ in. Used with electric drills of ½-in. capacity, or larger, for cutting clean holes in sheet metals, pipes, cast iron, wood, tile, plaster, marble, molded plastics and other composition materials. — **Skilsaw, Inc., 3316 Elston Ave., Chicago, Ill.**

HYDRAULIC-POWER-CONTROLLED MAINTAINER GRADER for use with any medium-size wheel or track-type tractor is equipped for one- or two-man operation. Said to be rugged enough for heavy grading with an 8-ft. blade or for patrol maintenance with blades up to 16 ft. New feature. Unique design

of circle which consists of two large diameter concentric steel plates, flanged and fitted one inside the other. Larger outside plate is welded to drawbar; smaller turns easily inside larger, but is closely fitted and firmly held to prevent chattering. Moldboard attached to heavy steel plates welded to inner circle is said to be exceptionally strong, to do away with chatter and to provide easy adjustment of blade angle. Easily detachable, leaving tractor free for other work. Power hydraulic system gives instant effortless control over raising, lowering and sideshifting blade, and sideshifting grader on rear axle. Electrically welded main frame. Solid cast iron wheels. Large, heavy-duty pneumatic tires. — **Good Roads Machinery Corp., Kennett Square, Pa.**

DIESEL ENGINE for Dodge 3-ton trucks is full-compression-ignition diesel of 331-cu.in. displacement with torque and power ratings of 226 lb.-ft. at 1,000 r.p.m. and 95 hp. at 2,600 r.p.m. 14.5 to 1 compression ratio is used. Engine is six-cylinder, four-stroke cycle type with 3¾-in. bore and 5-in. stroke. Tin-



plated steel-strut autothermic pistons 5 15/32 in. long permit close piston fits. Three tin-plated compression rings and two tin-plated oil rings are used, upper ring being ⅛ in. below top of piston and always in contact with water jacketed portions of cylinder wall. Seven precision-type replaceable main bearings 3-in. in diameter are employed, giving 36.89 sq in. projected bearing area. Connecting rods are 10 7/16 in. long, c. to c. with ⅛-in.-diameter bronze piston bearings and 2 5/16x1 7/16-in. replaceable copper-lead crank pin bearings. Other advantages: (1) full pressure lubrications; (2) full 24-v. electrical system; (3) overhead valves; (4) double-O-shaped combustion chamber with auxiliary double chamber energy cell; (5) fuel injection pump with automatic control of injection timing, in accordance with engine speed, and speed-governed regulation of maximum fuel quantity. — **Dodge Truck Div., Chrysler Corp., Detroit, Mich.**

MORE POWER

CAPACITIES, ½ TO 15 TONS · THE TRUCK OF VALUE ·

with Astonishing Gas Savings!

You get more pulling power with a GMC—and now 1939 owner reports prove that GMC's are breaking gas economy records right and left! Says one: "Almost 25% reduction in fuel consumed over other trucks used on the same routes." Says another: "We are now getting 10% to 20% more mileage with our new GMC." Measured fuel savings up to 40% are on record! Pull your loads easier—*at less cost*—with a GMC!

NOW—Lowest Prices in GMC History!

Our own YMAC Time Payment Plan assures you of lowest available rates

GMC TRUCKS TRAILERS - DIESELS

ACTION! TRACTION!
Tandem-Drive
TRUCK SHOVEL-CRANE
TRUCK MOBILITY
REAL STABILITY
A high production machine on its own dual Tandem-Drive Michigan chassis. Saves time and money because it's quickly convertible to Crane, Clam, Dragline or Trench Hoe.
WRITE TODAY FOR BULLETIN CM205
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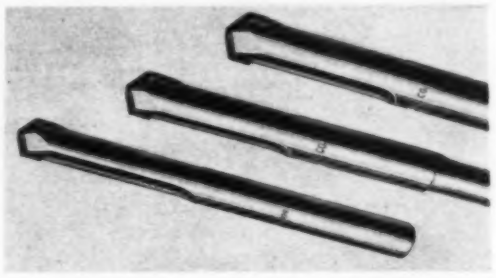
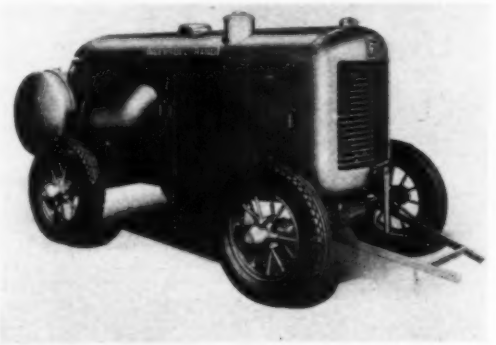
CARBIDE-TIPPED FLAT DRILLS said to reduce at least 50 per cent drilling time in concrete, brick, tile, slate, marble and other non-metallic materials. Used in portable electric drills or hand braces in



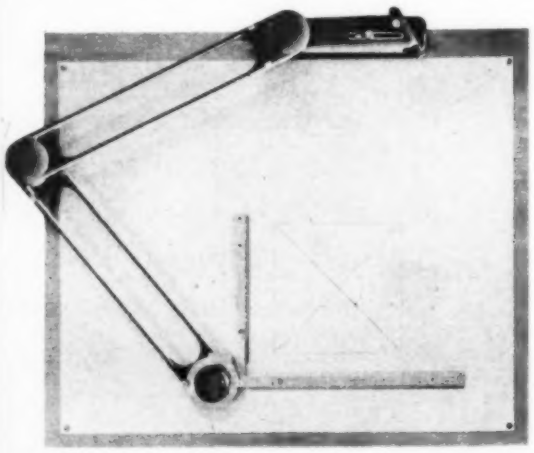
drilling for installation of expansion shields and for other such pruposes. Drills also are said to be silent, accurate and to eliminate much breakage of building materials resulting from use of hammer-type drilling. Available in sizes from ⅛ to 2 in. in diammeter.—**Super Tool Co., 21650 Hoover Rd., Detroit.**

STREAMLINED AIR-COOLED TWO-STAGE PORTABLE COMPRESSORS available in five sizes for actual capacities of 85, 105, 160, 210 and 315 c.f.m. of air at 100-lb. pressure. Improvements: (1) Bell housing connection making compressor and engine



practically one unit; (2) air intake relocated on top of roof; (3) thermostatic control replaces adjustable curtain and automatically assures correct cooling water temperature for engine; (4) more convenient location provided for air receiver and fuel tank; (5) use of two low-pressure cylinders for each high-pressure cylinder provides 25 per cent greater radiating capacity, thus insuring uniformly low operating temperatures. Powered either by Waukesha heavy-duty industrial-type gasoline engines or by Ingersoll-Rand type "H" oil engines. New models have patented channel valves which are said to insure more efficient, quieter and cooler operation of machine.—**Ingersoll-Rand Co., Phillipsburg, N. J.**

DRAFTING MACHINE of new design combines maximum convenience, speed and accuracy with simplicity. Streamlined arm of company's Model 77 incloses bands and working parts, minimizing accumulation of dirt. Protractor is located above arm



for freedom of manipulation and full-circle vision by draftsman. Equipped with ball-bearing joints and frictionless spring support for slightly inclined boards, facilitating quick, easy setting of either scale to an exact point. Secondary 360-deg. protractor movement with thumbscrew clamps makes possible rapid alignment of protractor to drawing or to any other desired baseline.—**Universal Drafting Machine Co., Cleveland, Ohio.**

THIS WIRE ROPE NEVER HAD A CHANCE to give the full service of which it was actually capable. It was a victim of adverse working conditions. It was used on a sheave too small for its size and construction, and the high bending stresses imposed on the wires resulted in fatigue and premature failure. A condition of this kind (sheaves or drums too small) is both *unsafe* and *costly*.

In order to obtain the most economical service from wire rope, it is of vital importance that drum and sheave diameters are as large as possible.

Standard practice has established certain ratios for sheave and drum diameters for the various wire rope constructions, which are given in the following tables. All diameters are to be measured from bottom of groove.

It should be understood that diameters listed as "minimum" are not recommended. Sheaves and drums of recommended diameters, *or larger*, will give increased rope life—consequently, more economical service. Anything smaller than "minimum" is critical—for both efficiency and safety.

Rope Construction	Average Diameters Recommended	Minimum Diameters
6 x 37 Round Strand	27 times rope diam.	18 times rope diam.
8 x 19 Round Strand	31 " " "	21 " " "
6 x 19 Round Strand "Style B" Flattened Strand "Style G" Flattened Strand	45 " " "	30 " " "
6 x 7 Round Strand "Style D" Flattened Strand	72 " " "	42 " " "

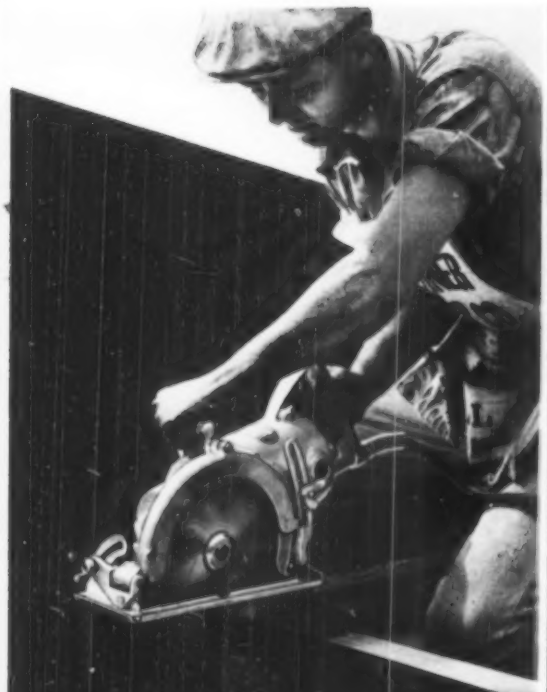
This advertisement is published for the purpose of helping all wire rope users obtain safer and more economical service from their wire rope. We also publish a booklet "*Practical Information on the Use and Care of Wire Rope*," and we would be glad to send a complimentary copy to anyone interested.

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS • ESTABLISHED 1857

5909 KENNERLY AVENUE • • ST. LOUIS, MO.

NEW YORK • • 90 West Street
CHICAGO • 810 W. Washington Blvd.
DENVER • • 1554 Wazee Street
SAN FRANCISCO • 520 Fourth Street
PORTLAND • 914 N.W. 14th Avenue
SEATTLE • 3410 First Avenue South



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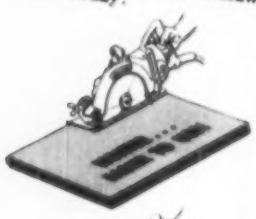
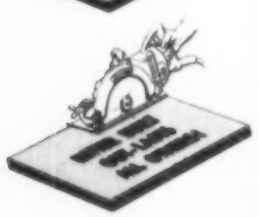
SKILSAW
CAN GIVE YOU
SKILSAW'S
COST-CUTTING
PERFORMANCE!

• Only Modern SKILSAW has the power and speed and ease of operation you have a right to expect when you buy a portable electric handsaw — 19 years of constant improvement have made SKILSAW (the original electric handsaw!) THE BEST on the market today!





Test Modern SKILSAW on your toughest sawing jobs and you'll see why it is *more for your money!* SKILSAW out-performs all others under heaviest loads—it saws faster, easier, deeper on any kind of job. It is lighter, better balanced, more convenient to handle. It is engineered to give you many years of trouble-free service. No other saw can give you all of these profit-making features.

Buy a *genuine* SKILSAW now and you'll be money ahead on every job this season!

9 powerful models for wood, metal, stone and composition.

SKILSAW, INC.
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214 E. 40th St., New York — 52 Brookline Ave., Boston — 1429 Spring Garden, Philadelphia — 2124 Main Street, Dallas — 918 Union St., New Orleans — 1253 South Flower Street, Los Angeles — 2065 Webster Street, Oakland. Canadian Branch: 85 Dalhousie Ave., Toronto.

SKILSAW
PORTABLE ELECTRIC TOOLS
SAVE MONEY IN EVERY INDUSTRY!
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Sold by leading distributors of mine, mill, hardware and contractors' supplies

PORTABLE PRINTER reproduces drawings, plans and specifications, dry and ready for use, in from 1 to 5 min. Process gives blue lines on white background, using Ozalid dry process paper. Sizes up

to 12x18 in. Device having general appearance of traveling suit case with carrying handle, is 22 in. long, 16 in. high and 11 in. deep, and weighs 33 lb. Is equipped with 6 special lamps and developing cylinder. Operates by plugging in on ordinary 110-volt, a.c. electric light or power circuit. — **Electronic Products Manufacturing Corp., 208 W. Washington St., Ann Arbor, Mich.**

HIGH-LIFT PUMP is designed to operate in drilled deep wells as small as 3-in. diameter with lifts from 40 to 1,000 ft. Pumping element of Peerless Hi-Lift unit consists of a stator and a rotor, both helical in form, and a drive shaft assembly powered by electric motor or belt. Helices are worm threads, stator having double thread and rotor a corresponding single thread. Rotor rolls on surface of rubber-lined stator at slow speed of 1,760 r.p.m., squeezing liquid ahead at uniform rate of flow. No gears, valves, sucker rods or cup leathers. One pumping element, it is claimed, will lift 50 g.p.m. 200 ft.; two pumping elements will lift the same quantity per minute 500 ft. — **Food Machinery Corp. (Peerless Pump Division), 301 West Ave. 26, Los Angeles, Calif.**

NEW DIESEL LUBRICATING OIL, called RPM 'Delo, the result of 90,000 test-hours and 10,000 test-miles, is designed to eliminate all service weaknesses, including ring sticking, corrosion of alloy bearings, wear of cylinders, pistons and rings, and filter clogging. The compounding material used in the new lubricant is a powerful anti-oxidant and insures stability in the presence of moisture and in storage. Another advantage is capacity of spreading and lubricating hot metal surfaces instead of receding and leaving them dry. The new RPM Delo, it is claimed, while capable of lubricating all sizes and types of diesel engines correctly, is particularly adapted to the smaller high-speed diesel units.— **Standard Oil Co. of California, San Francisco, Calif.**

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2. The STONE INDUSTRIES

By Oliver Bowles, U. S. Bureau of Mines. This new second edition covers comprehensively the building-, decorative-, and crushed-stone industries in all their ramifications — qualities, their uses, methods of quarrying and manufacturing, and marketing. Covers the geology and distribution of developed deposits in every state. 519 pages, illustrated, $5.00.

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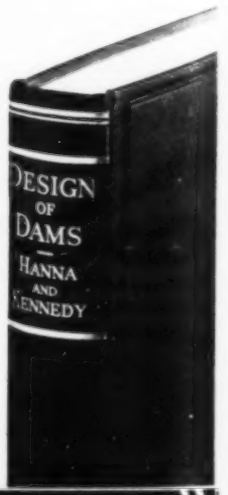

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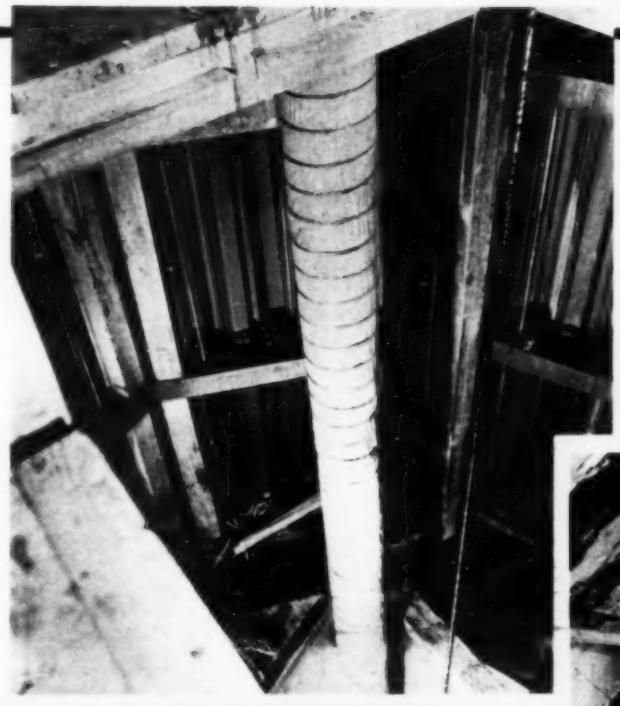
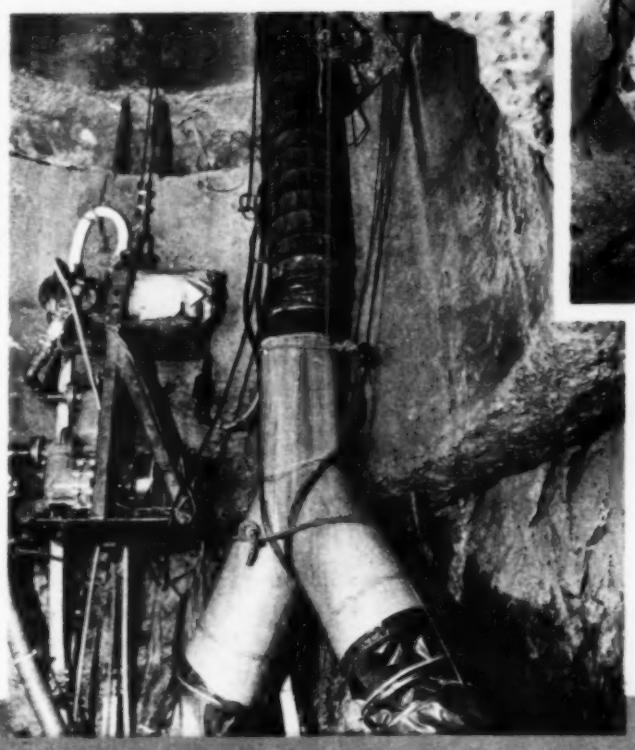
This ventilating duct
DOES TWO JOBS
...AND IS EASIER TO HANDLE!



● The Utah Construction Company have Contract No. 322 of the West Branch-Kensico section of the world's longest tunnel—the Delaware Aqueduct. They hau to have a ventilating duct that would do two jobs: (1) Force clean, fresh air *into* the tunnel (2) Suck *out* smoke, dust, and powder fumes after blasting.

● Non-collapsible "Ventube"* was installed in Shafts 11 and 12. The ease with which it was handled and the satisfactory results obtained made "Ventube" Utah's choice throughout their section of the tunnel.



● "Ventube" is made of extra-heavy, long-fibered Hessian cloth that is both coated and impregnated with a special rubber compound. It is durable, flexible, time saving. Acid, gases, fungus, moisture can't hurt it. And all that is needed besides "Ventube" to assure best results is a fan of adequate capacity.

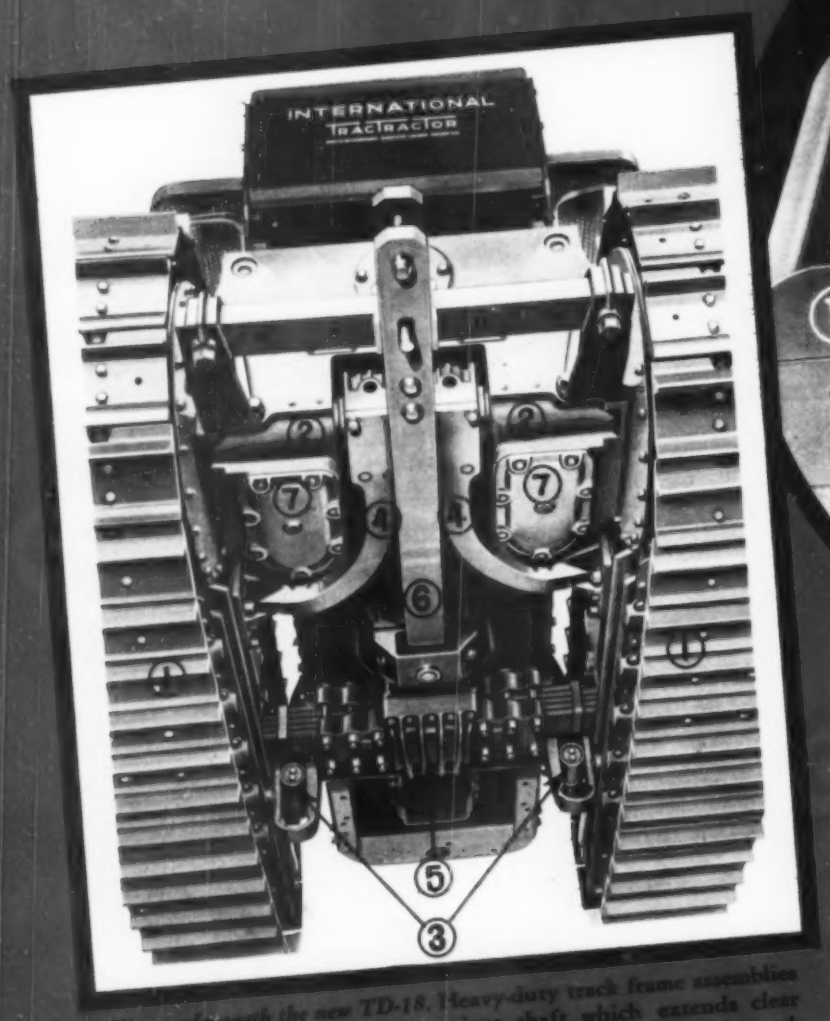
Install "Ventube" on your toughest job. See for yourself how quickly it can be suspended and taken down—how completely it removes dust, smoke and powder fumes. Let "Ventube" help you reduce man-hours, speed up work, and cut costs. We'll be glad to submit estimates for work on which you're figuring.

E. I. DU PONT DE NEMOURS & COMPANY, INC.
"Fabrikoid" Division • Fairfield, Connecticut

DU PONT
VENTUBE
THE FLEXIBLE VENTILATING DUCT

*"Ventube" is du Pont's registered trademark designating its rubber impregnated flexible ventilating duct.

Right: Exceptional comfort and convenience for the operator in the new TD-18. Roomy, spring-cushion seat; full vision for all work; standard automotive gear shift; convenient, adjustable controls; *easy to operate—power-actuated steering clutches* make the TD-18 the *easiest steering crawler tractor built.*



View underneath the new TD-18. Heavy-duty track frame assemblies (1) oscillate independently on pivot shaft which extends clear through main frame at (2). Rugged roller stabilizer (3) holds track frames in longitudinal alignment; solid steel diagonal arms (4) hold them in vertical alignment. Pivot shaft is then relieved of twisting stresses by ball-and-socket outer pivots and special diagonal-arm inner pivot bearings. Heavy-duty, saddle-mounted equalizer spring (5) carries front-end weight of tractor. Drawbar (6) is mounted well forward, and below pivot shaft. Plates (7) permit removing and replacing each steering brake independently.

THESE FEATURES MEAN EFFICIENCY, LOW COST, LONG LIFE

1. Six-cylinder full Diesel engine.

2. Engine is started easily from the operator's seat.

3. Six forward and two reverse speeds.

4. Automatic clutch brake for fast gear shifting.

5. Easiest steering crawler tractor built. Power-actuated steering clutches.

6. Steering levers and pedals adjustable to suit operator.

7. Pivot shaft relieved of twisting stresses, and tracks kept in alignment, by ball-and-socket outer pivots, diagonal-arm inner pivot bearings, and roller stabilizer.

8. Track shoes keyed to track links to prevent loosening of shoes.

9. Triple-gear oil pump. Full-pressure engine lubrication at all working angles.

10. Positive track roller lubrication at all speeds. Quintuple-sealed track rollers have patented gravity lubrication at low speeds and pressure lubrication at high speeds. Oil and dirt seals on both sides of sprockets. Self-cleaning idler wheel.

11. Tocco-hardened crankshaft with replaceable main and connecting rod bearings.

12. Unit construction. Each steering brake, steering clutch, track frame assembly, and other units, adjusted or replaced without disturbing adjacent parts.

13. Famous TracTracTor accessibility. More productive hours, low maintenance cost.

14. Allied equipment engineered for the TD-18 by well-known manufacturers.

Left: Balanced power, balanced speed, balanced weight in the new TD-18—plus *balanced allied equipment*—result in new standards of economy and efficiency on the job. Among the wide variety of equipment available for the TD-18 is this 4-wheel, cable-operated scraper with a heaped capacity of 8½ cubic yards.

International Harvester ANNOUNCES A 70 H.P. DIESEL TRACTRACTOR

HERE is real news that operators of heavy-duty mobile power have long been looking for: International Harvester now presents a new 70 h.p. (*drawbar*) Diesel TracTracTor, extending the benefits of International design and service to a much broader field.

In this latest product you will find the sound engineering and precision manufacture that is well-known to all users of TracTracTors—*plus advanced design, many patented features and improvements.* The flexible adaptability of the TD-18, with its 6 forward and 2 reverse speeds, will be a surprise, whatever your experience up to this time.

Equipment especially designed for use with the TD-18 includes **SCRAPERS, BULLDOZERS, BULLGRADERS, ROAD GRADERS, WAGONS, SNOW PLOWS, WINCHES, LOGGING ARCHES.** Company-owned branches and International industrial power dealers will tell you all about the features of the International TD-18 TracTracTor.

INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)
180 NORTH MICHIGAN AVENUE CHICAGO, ILLINOIS

INTERNATIONAL POWER *is made by the makers of* **INTERNATIONAL TRUCKS**

"Wear INSURANCE" is built into every Owen Bucket

Efficient operation is of first importance in a bucket, but long service with freedom from repairs is equally essential.

In many important details, Owen design is conducive to this long, satisfactory operation. Read, in the new catalog about protected sheaves, sealed shaft bearings, one-piece non-wobbling head, non-chafing cables, etc.

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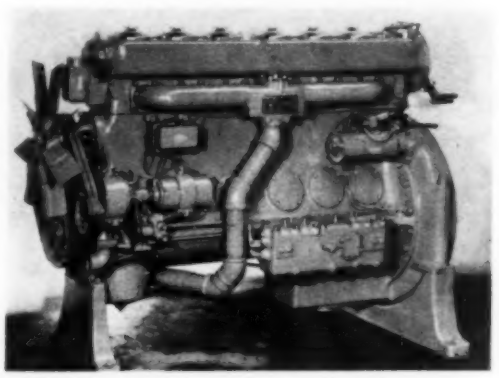
6020 Breakwater Avenue, Cleveland, Ohio
Branches: New York Philadelphia Chicago Berkeley, Cal.

200-HP. DIESEL ENGINE conforms in design to standard model said to be unusually successful in service. Injection is direct into plain symmetrical combustion chamber. Injector and fuel pump combined in one unit easily and quickly removed and replaced. Since there are no high-pressure fuel lines, injectors cannot become air bound. Pistons oil-cooled under pressure, eliminating ring troubles and need for special lubricating oils. Each cylinder has four valves, assuring maximum breathing capacity and rapid scavenging. Should oil pressure drop below fixed minimum pressure, engine automatically shuts itself off. Single lever control permits easy and simple toggling-in for remote control. 24-v. starter. May be had with or without radiator and full inclosure. Skids, outboard bearings, and direct-connected generator units also available.—**Murphy Diesel Co., Ltd., Milwaukee, Wis.**



SALT DISPENSER for supplying salt tablets to men on hot jobs and to every one in hot weather. Made of molded plastic and slipped easily into place in a bracket. Top unscrews for filling and shuts tight to protect tablets from outside contamination. Label on dispenser gives directions for taking tablets. Consumption of salt tablets enables men on hot jobs to keep amount of salt in blood at proper proportion, thus avoiding heat sickness. Tablets obtainable in convenient cartons containing approximately 1,000. —**International Salt Co., Inc., Scranton, Pa.**

"Old Faithful" that's what construction and maintenance men everywhere call their G & R self-priming centrifugal pumps. Fool proof because they're gadget-less. They've got something the others haven't—simplicity. They can't clog—they're not quitters.

The only pumps with renewable wearing plate — they're modern.

G & R's will deliver more water per hour and pump more hours at less cost — under any conditions.

WE WILL SHIP YOU ONE
and LET YOU BE THE JUDGE!

You'll find them
THE MOST DEPENDABLE PUMPS FOR THE LEAST MONEY
...bar none

PROMPT DELIVERY ... from Stock in 100 Principal Cities

WRITE

THE GORMAN-RUPP CO., Mansfield, Ohio

COFFING
SAFETY PULL RATCHET LEVER HOISTS
...SAVES TIME LOSSES FOR LIFTING AND PULLING JOBS

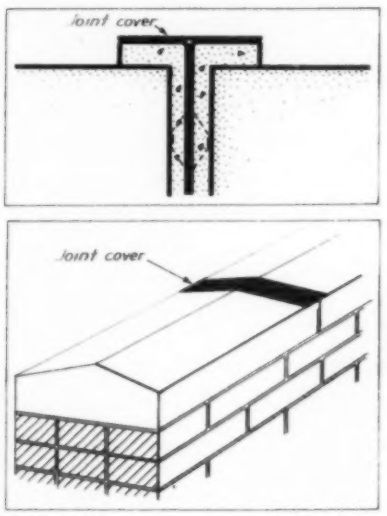
No need to take a number of men from their jobs, thereby losing valuable time, to do a lifting or pulling job. One man and a Coffing Safety-Pull Ratchet Lever Hoist will do the lifting and pulling jobs better, quicker, and safer. It makes possible tremendous savings because of high quality, speed, safety features, and all around efficiency. Its uses are unlimited.

The safety-pull ratchet lever hoists are designed to meet the demand for heavy capacity hoists that can be easily operated and transported on the job. The range of sizes and capacities gives you a wide choice for your particular need—from ¾-ton cap. which weighs 14 lbs. to 15-ton cap. weighing 150 lbs. You will be repaid a hundred-fold in time, money, and labor because the initial cost is small, smaller than for conventional hoists of the same capacities. There is no substitute for Coffing Hoists in construction work—let us convince you. Write today.

COFFING
Advanced Design
HOISTS
SPUR GEAR
RATCHET LEVER
ELECTRIC

COFFING HOIST COMPANY
DANVILLE, ILLINOIS

JOINT COVER for protecting joints in copings or parapet walls and in projecting courses, such as cornices, belt courses, and multiple sills. Shaped from one piece of 12-oz. lead-coated copper so that it will expand with contraction of natural cast stone or terra cotta and maintain positive seal, preventing leakage of water into crevices. Regular mortar will serve to set these covers in place. For use in both new and old structures.—**Dusing & Hunt, Inc., 1929 Elmwood Ave., Buffalo, N. Y.**



A NEW PLYFORM JOB

THE CURVED CONCRETE forms of these sedimentation tanks in the new sewage system at Buffalo, N.Y., were made of ⅜" Plyform-grade Douglas Fir Plywood.

NOTICE HOW THE big plywood panels gave 100% coverage—saved time and labor—and produced the smooth, finless surfaces so important on a job like this.

Every genuine Douglas Fir Plywood concrete form panel is now *"grade trade-marked"*

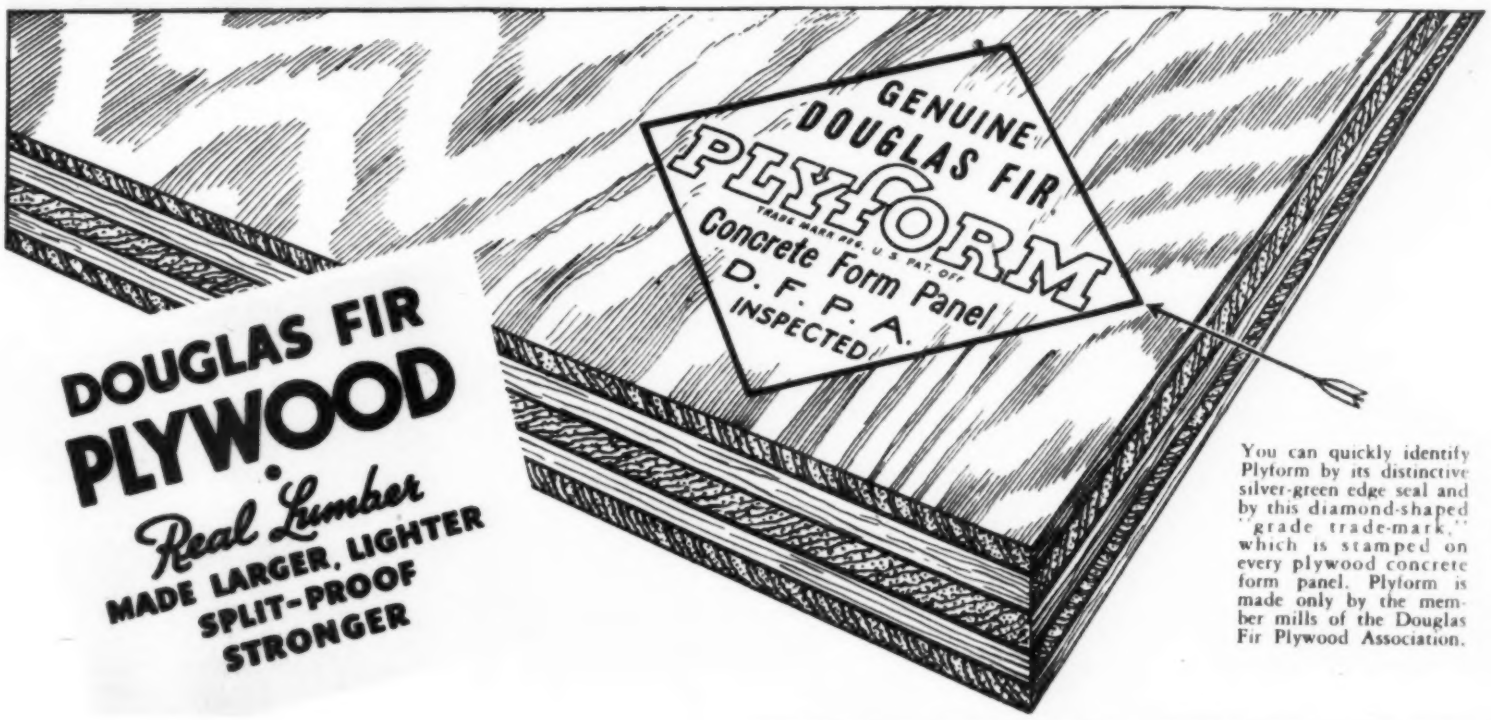
PLYFORM

1. The surfaces of every Plyform panel are oil-treated at the mill!
2. The panels are edge-sealed in distinctive silver-green and grade trade-marked "Plyform" for instant identification.
3. Only special premium water-resistant glues are used.
4. A Plyform panel serves as sheathing and lining combined.

PLYFORM is the only grade of Douglas Fir Plywood made specifically for concrete form work. Oil-treated and edge-sealed at the mill, it does *a better job for less money!*

Strong and rigid, yet lightweight and easy to handle, Plyform panels give 100% coverage without waste. They serve as sheathing and lining combined . . . save up to 12c a square foot on rubbing and finishing costs alone . . . strip easily . . . can be re-used as many as 15 times if handled properly* . . . are then salvageable for sub-flooring and similar purposes. Specify Plyform panels on your next concrete job. Any recognized lumber dealer can supply you. For more information about Plyform, write Technical Division, Douglas Fir Plywood Association, Tacoma, Wash.

*When more than 15 re-uses are desired or in excessively humid areas, specify Exterior Douglas Fir Plywood (EXT-DFPA) for concrete forms.



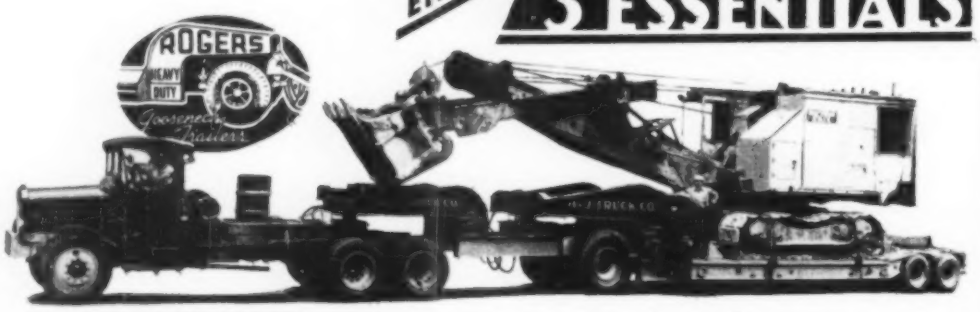
You can quickly identify Plyform by its distinctive silver-green edge seal and by this diamond-shaped "grade trade-mark," which is stamped on every plywood concrete form panel. Plyform is made only by the member mills of the Douglas Fir Plywood Association.

THE HELTZEL CONTROLLED
CENTER-LINE DISCHARGE
CONCRETE BUCKET
GROUT-TIGHT
BULLETIN T-29-CB

The Heltzel Steel Form & Iron Co.
WARREN, OHIO

HELTZEL STEEL FORM & IRON CO.
WARREN, OHIO, U.S.A.

ROGERS TRAILERS EMBODY THESE 3 ESSENTIALS



LOADABILITY— Quick, easy loading due to extremely low construction.

HAULABILITY— Lightness with strength, permitting speedier travel at less cost.

BREAKEABILITY— Safe, dependable control at all times due to the new equalizing brakes.

WRITE FOR CATALOGUE

ROGERS BROTHERS CORPORATION

EXPERIENCE ● *built it* ...

220 Orchard Street
ALBION, PENNA.

● PERFORMANCE *sold it*...

LIGHT-DUTY PORTABLE ELECTRIC DRILL. ¼-in.-diameter, called "Drillmaster" and designed for general intermittent service in maintenance and installation work, weighs 4 lb. and is 12 in. in overall length. Torpedo-like design convenient for

use in hard-to-reach places. Said to be light, compact and easy to handle. May be had for 110 or 220 v. Universal-type motor operates on either a.c. or d.c. Free speed, 2,000 r.p.m. Equipment includes ¼-in. three-jaw Jacobs chuck, grip handle with recessed, thumb control switch, three-conductor cable with ground wire and plug. Oil-less, self-lubricating bearings and special alloy-steel gears for cushioning shock loads and providing quiet operation. Aluminum handle and gear case. — **Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago.**

CONCRETE FLOOR PAINT, called Alkalox, is designed especially for use in basements to resist effects of alkalis, acids and dampness when applied to surfaces of concrete or plaster. Dries quickly. Alkalox is made with synthetic gums, not oils, and comes in four standard colors: gray, red, green and brown. Applied like ordinary paint after surface to be coated is first etched with a 10 per cent solution of muriatic acid and washed with clean water to open the surface pores of the concrete and assure complete amalgamation of the paint with the floor. Two coats are generally needed; coverage is said to be 400 sq.ft. per gallon per coat. Forms scrub-proof film claimed to be exceptionally tough, resilient and elastic, creating effective seal against water, acids, alkalis, oil and grease. — **Minwax Co., Inc., 11 West 42nd St., New York, N. Y.**

¾-CU.YD. EXCAVATOR built especially for highway construction and sand and gravel pits has twelve features which are said to provide unit with stamina and power of large excavator without sacrificing speed or mobility. These include: tubular all-welded

steel boom, anti-friction bearings at each important point, cone-type rotating clutches controlled by single lever, chain crowd for positive control and easy boom adjustment, bevel gears inclosed in oil, guarded boom points and positive locks on swing shaft which prevent upper frame from rotating while propelling. Readily convertible to pull-shovel, crane, clamshell or dragline. Self-cleaning crawlers have tapered open pockets in drive sprockets which provide dirt shedding action.—**Marion Steam Shovel Co., Marion, Ohio.**

HOW OFTEN HAS THIS HAPPENED TO YOU?

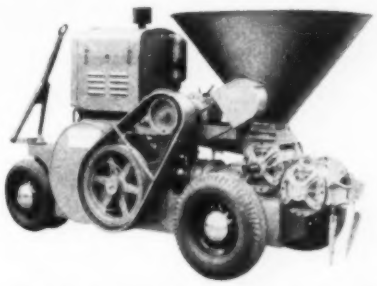
When you're forced to sit back and watch profitable concrete jobs go to a low-bidding competitor, check up on your method of placing concrete! The chances are that your bidding figures could be far lower if you'd estimate the cost of placing concrete on the basis of the performance of one of the Rex Pumpcretes. For, more often than not, on most jobs of over 2500 yards a Rex Pumpcrete brings new efficiency and new low placing costs.

Before you bid, see how the Rex Pumpcretes, with capacities ranging from 15 to 65 cubic yards of concrete per hour, can help you outbid the field!

CHAIN BELT COMPANY *OF MILWAUKEE*

PROCESS—GIESE • SYSTEM—KOOYMAN

REX PUMPCRETE



CHECK UP ON THE REX 160 PUMPCRETE!

This new low-cost Rex Pumpcrete is mounted on balloon tires for real portability. Through 6" pipe line it can pump 15 to 20 yards into the forms every hour, hour after hour. Send for your copy of "Presenting the Rex 160 Pumpcrete." Use this coupon.

CHAIN BELT COMPANY
1664 W. Bruce St., Milwaukee, Wisconsin

Please send me my copy of "Presenting the Rex 160 Pumpcrete."

Firm Name .....

By .....

Address .....

City ..... *State* .....

A Few Taps With a Hammer, and it's Good as New!

The section of "Newtype Cord" at left has been crushed out of shape in service, with flow greatly retarded.

This same section is shown on the right, after it had been tapped into shape again with a hammer, without damage to carcass or cover. The full inside diameter has been restored.

GOODALL

"NEWTYPE CORD"

SUCTION and DISCHARGE HOSE

There are two reasons why "Newtype" Suction and Discharge Hose has established a reputation for *real* economy.

First — its great strength and durability insure long life and unequalled efficiency, in spite of the "beating" this service imposes even under normal conditions.

Second — its life and efficiency are not impaired by crushing, for it can be quickly tapped into shape again with a hammer, so that its full diameter and maximum pumping efficiency can always be retained.

Goodall "Newtype Cord" is a smooth bore hose with a heavy elastic rubber tube that resists the cutting action of abrasives and insures a rapid, unchecked flow. A special wall construction gives it extreme flexibility. Add unusually light weight and easy handling, and you'll realize why contractors everywhere depend on this hose for low cost, trouble-free service.

Let us quote on your requirements

GOODALL RUBBER CO.

5 S. 36th STREET • PHILADELPHIA, PA.

New York • Pittsburgh • Chicago • Boston • Houston

FACTORY: TRENTON, N. J.

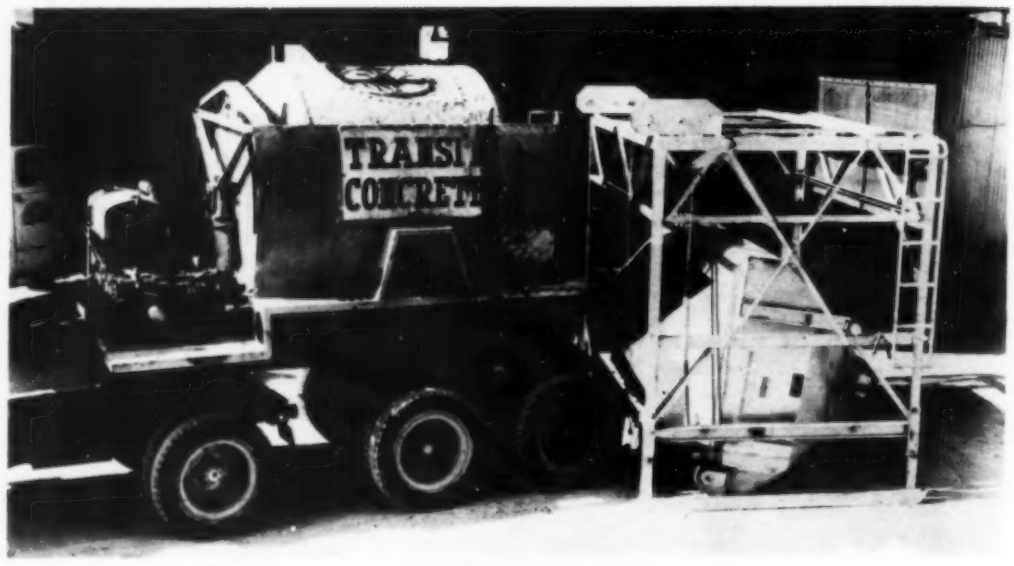
GOODALL RUBBER CO. of CALIF.

San Francisco • Los Angeles • Seattle

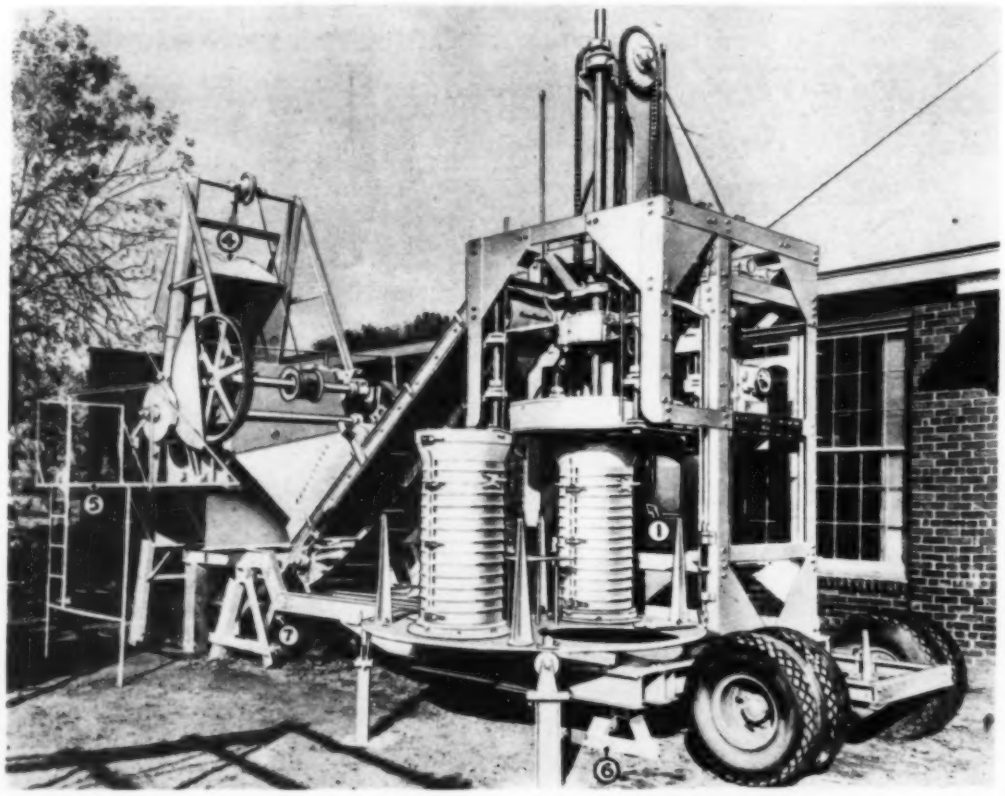
Salt Lake City • Phoenix

GOODALL — The originators of the Standard of Quality Line (Reg. U.S. Pat. Off.) of contractors' rubber goods

PORTABLE ROTATING HOPPER (right and below) for handling full loads of truck-mixed concrete to wheelbarrows and carts as needed enables truck-mixer to dispose of its contents immediately and to be available for other jobs. Also eliminates all possibilities of segregation of aggregates and assures load of uniform concrete. In operation, hopper (riding on special pneumatic-tired trailer under-carriage) is towed to job behind any commercial truck. At job, unit is detached from trailer, steel angle extension legs are dropped and channel skids connecting legs turned up to level position. Arriving truck mixer, by means of sheaves and cable, first rotates hopper body in its frame to receiving position, then dumps its load of concrete rapidly over 3-ft. 7-in. high loading side and finally returns hopper to discharging position, in which it is automatically locked. Height of hopper and frame, 10 ft. Width, less than 8 ft. in carrying position. — **Ransome Concrete Machinery Co., Dunellen, N. J.**



PORTABLE PIPE-MAKING MACHINE similar to McCracken Model T Dual Packer-Head stationary unit manufactures pipe from 4 to 36 in. in diameter. Mounted on special trailer with mixer and skip loader and 100-hp. industrial diesel motor supplying power both to machine and mixer. Unit is available by lease exclusively to users of Dual Packer-Head permanent plants, fee for use being fixed by size of job, type and number of pipe sizes and distance between operator's and pipe customer's plants. All that is needed for operation of machine is well drained piece of land in advantageous location, no additional plant being necessary. The photograph shows machine backed into pit ready to operate. (1) 100-hp. diesel motor in operating position; (4) skip loader; (5) platform for mixer operator; (6) rear-end supporting "horse" — **Concrete Pipe Machinery Co., Sioux City, Iowa.**



CHEVROLET TRUCKS

UNBEATABLE FOR DEPENDABILITY AND ECONOMY!

There is every reason in the world why you should now benefit by what Chevrolet has to offer in the way of better trucks, greater truck economy, and wide range of models covering every possible truck requirement.

Because, in 1939 Chevrolet is in a better position to meet your hauling needs—whatever they are—than at any other time in Chevrolet history.

All the way from smart, speedy delivery trucks to massive heavy-duty units of 14,000 pounds gross rating, Chevrolet offers 45 models . . . eight different wheelbases . . . and an amazing variety of factory-built bodies.

This is a good time to take advantage of Chevrolet dependability and economy—qualities which have made Chevrolet the nation's largest builder of trucks.

CHEVROLET MOTOR DIVISION, *General Motors Sales Corporation*, DETROIT, MICHIGAN

General Motors Instalment Plan—convenient, economical monthly payments. A General Motors Value.

CHEVROLET

MASSIVE NEW SUPREMLINE TRUCK STYLING . . . COUPE-TYPE CABS . . . VASTLY IMPROVED VISIBILITY • FAMOUS VALVE-IN-HEAD TRUCK ENGINE • POWERFUL HYDRAULIC TRUCK BRAKES (Vacuum-Power Brake Equipment optional on Heavy Duty models at additional cost) • FULL-FLOATING REAR AXLE on Heavy Duty models only (2-Speed Axle optional on Heavy Duty models at additional cost)

Lower Haulage Costs

with but a Small Investment

MOVING twice the dirt at half the unit cost — that's what the Insley Dump Wagon is doing for many contractors. Dumps on the run. Automatic electric door closing control.

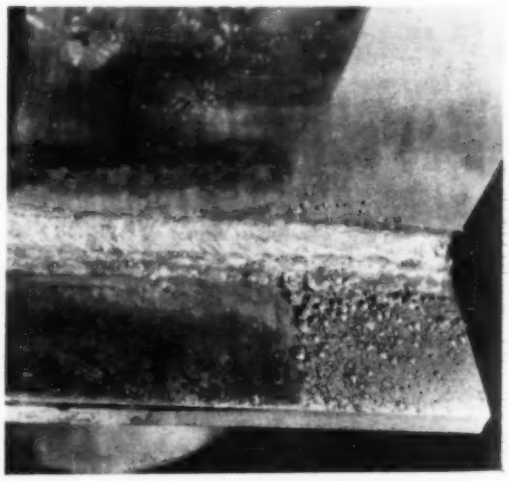
Capacity 5 cu. yds.—all-steel welded construction — adapted to any standard 1½-ton truck. More flexible in operation — more readily adaptable than more expensive equipment —more economical to own—cheaper to operate . . . and the cost is small.

INSLEY

IMPROVED 15-TON EMERGENCY JACK Simplex 310A embodies ten new features: 1-in. greater lift, totalling 14 in.; 37 per cent easier lifting; triple-toothed lifting and retaining pawls; greater overload capacity by actual hydraulic press test; jack

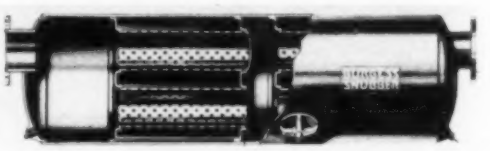
base area increased 10 sq.in.; rack bar toe lift increased to more than 2 sq.in.; load may be raised or lowered full limit of rack bar when working at an angle; base locking hook can be engaged or disengaged by operator's foot; more convenient carrying handles; greater rack bar gib slide bearing. Furnished with 5-ft. steel chain, forged steel auxiliary shoe and 5-ft. heat-treated lever bar.—**Templeton, Kenly & Co., 1020 S. Central Ave., Chicago, Ill.**

WELD SPATTER INCONVENIENCE in welding metals said to be prevented by new material called Glyptal which can be used on any metal surface including polished stainless steel. Manufacturer writes that it will not produce carbon to make weld hard or brittle and will not reduce ductility; will not



give off smoke to fog the atmosphere and will not form gas pockets or cause weld to be porous. Should be sprayed on, preferably in thin coating. Material also serves as priming coat before painting and prevents rusting of steel. Will withstand temperatures up to 600 deg. C. for ½ hr.; after this time it will begin to evaporate. — **General Electric Co., Schenectady, N. Y.**

EXHAUST QUIETING DEVICE, called "Snubber," non-acoustic, placed at any point in intake or exhaust system of engine or compressor, is said to eliminate cause of noise resulting from pulsating gases by snubbing peak velocities and pressures and producing smooth flow of gas. Operation of



Contractors get profits with the modern dirt-moving team of International TracTracTor and Bucyrus-Erie 4-Wheel Scraper.

1. — The scraper is specially designed for maximum performance with *this* tractor.

2. — The exclusive Bucyrus-Erie "double-curve" cutting edge gets capacity loads in the shortest possible distance.

3. — The scraper frame is a unit structure of welded steel and steel castings, combining great strength and light weight.

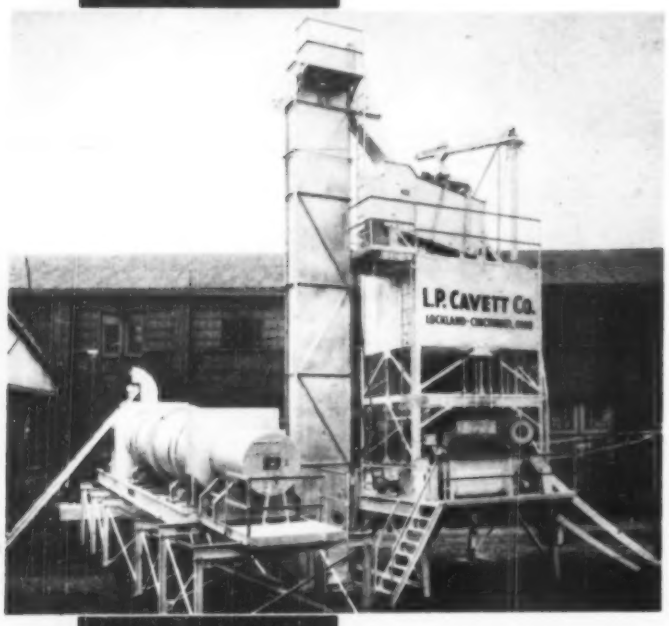
4. — The scraper dumps [illegible] and easily by tipping the bowl forward. Little horsepower is required and there is no necessity for the tractor to reduce speed.

5. — Accurate single-cable control permits spreading loads in layers to meet specifications.

See your International Industrial dealer for full details.

Bucyrus · Erie

SOUTH MILWAUKEE, WISCONSIN



MODEL P-A PLANTS ARE BUILT IN 4 SIZES

MODEL PA-15
1500 ≠ Mixer
MODEL PA-20
2000 ≠ Mixer
MODEL PA-30
3000 ≠ Mixer
MODEL PA-40
4000 ≠ Mixer

A NEW PORTABLE ASPHALT PLANT

in completely assembled sectional units easily moved by truck or rail and quickly erected without the use of a crane or gin pole.

Patents applied for — Built in 4 Sizes

Write for Bulletin T-260

HETHERINGTON & BERNER, INC.

701-745 Kentucky Avenue — Indianapolis, Ind.

BIGGER PROFITS! BETTER CONCRETE! WITH Mall CONCRETE VIBRATORS

MALL gas engine vibrator. Delivers 7000 vibration frequencies per minute.

With MALL vibrators on the job, you eliminate expensive hand spading, get greater strength, density and uniformity. You also effect greater economies through the use of coarser aggregate and less cement.

The same MALL power unit can be used for SURFACING, SAWING, SANDING, DRILLING and PUMPING to help you get the biggest dividends from your equipment investment.

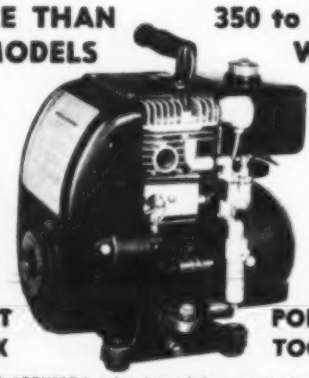
MALL TOOL COMPANY

7737 SOUTH CHICAGO AVENUE — CHICAGO, ILLINOIS

ONAN ELECTRIC PLANTS OPERATE ELECTRIC TOOLS ON ALL JOBS

MORE THAN 40 MODELS — 350 to 10,000 WATTS

LIGHT for NIGHT WORK — POWER for PORTABLE TOOLS



ELECTRIC SERVICE is being demanded more every day by Contractors who must complete Jobs FASTER, SAFER and AT LOWER COST. THIS IS WHERE ONAN ELECTRIC PLANTS "STEP INTO THE PICTURE".

These COMPACT, LIGHT-WEIGHT, PORTABLE ELECTRIC PLANTS supply all the "Juice" needed for operating Electric Tools, such as DRILLS, SAWS, GRINDERS, SANDERS and for FLOOD LIGHTING on NIGHT JOBS.

PORTABLE MODELS are furnished with convenient handles so they can be carried anywhere. All Models can be supplied on pneumatic tired Dollies for still easier handling.

Two of the 40 standardized Models IDEAL FOR PORTABLE WORK are a 900 Watt, 115 Volt, DC Units (shown above), weight 71#; and a 1500 Watt, 115 Volt, DC Unit, weight 145#.

ONAN ELECTRIC PLANTS are HEAVY-DUTY, SUBSTANTIALLY BUILT, ECONOMICAL RUNNING UNITS and are built COMPLETELY IN OUR OWN PLANT. They are built "to take it" on Construction Jobs.

THOUSANDS in use ALL OVER THE WORLD. They are serving as STANDBY UNITS where Power Line Failure would create an Emergency. They are used on Farms, Homes, and Camps to operate LIGHTS, RADIOS and All Appliances. 110 or 220 Volt, AC — 12, 32 and 110 Volt, DC — and Dual Voltage AC-DC Types. Manual, Full Automatic or Self-Starting. Shipped COMPLETE, READY TO RUN. Prices $90 and up.

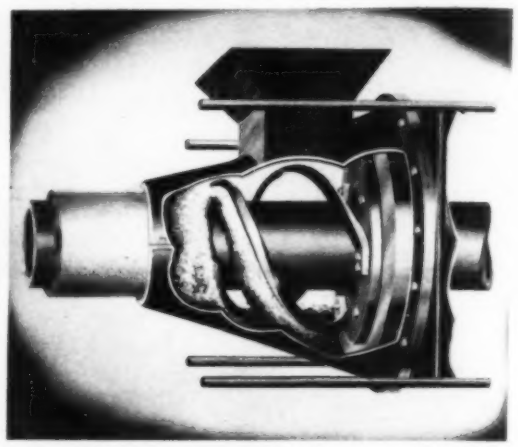
WRITE FOR DETAILS AND PRICES

D. W. ONAN & SONS

807 Royalston Ave. • Minneapolis, Minn.

Snubber is as follows: First fast moving slug of exhaust gas which is vented into exhaust system by opening of exhaust valve is trapped in high-resistance snubbing tube perforated radially to allow pent up gas to vent gradually into first snubber chamber. At same time recoil pressure from snubbing tube serves to slow up flow of scavenged gases thereby preventing pressure from dropping below atmospheric pressure. Slower-moving scavenged gases do not enter snubbing tube but are diverted through low-resistance exhaust tube in first chamber. Second stage of snubbing, comparable to first, removes any remaining impulses which may be present in exhausted gases. Effect of Snubber is to prevent sudden impact of slug of vented gas with atmosphere and also to stop usual inrush of air into exhaust pipe after discharge of slug, thus eliminating cause of exhaust noises. Snubbers available in wide range of sizes for standard, heavy-duty and spark-arresting service.—**Burgess Battery Co., 500 W. Huron St., Chicago, Ill.**

PERMANENT PROTECTION FOR PIPE LINES by Armor-Clad process of coating with cement or bituminous concrete is obtained with specially designed, patented machine which produces at reasonable cost dense, uniform outer jacket and forms perfect seamless bond with pipe. Machine is of light steel



construction assuring portability; it is adjustable to various sizes of pipe and can apply coatings in thicknesses ranging from ⅝ to 2 in. Easy removal of parts provides for passing of obstructions and joints. Armor-Clad process is based on theory that material of proper consistency may be made to adhere to pipe by means of spiral rubbing, troweling, and tamping actions of machine and, after being submitted to tremendous pressure is held firmly in position by atmospheric pressure because of intimate contact between steel and plastic. Under severe tests manufacturer claims that Armor-Clad is impervious to destructive forces of corrosion, electrolysis, abrasion and soil stresses. In one case pipe with 20 per cent of its area completely rusted away was rehabilitated and enabled to stand pressure of 90 lb.—**American Pipe & Steel Corp., Alhambra, Calif.**

HINGED-FRAME GOGGLES, for use in vocations that involve mechanical hazards to sight, fit over prescription glasses and swing up out of way without displacing headband. Frame of light-weight

material is attached to headband by double hinges that allow goggles to be pushed forward and up. Headband is attached to fabric cap and may be adjusted to comfort of wearer, thus doing away with "pressure headaches," common result of wearing old-type goggles held in place by elastic band.—**Sellstrom Mfg. Co., 615-49 N. Aberdeen St., Chicago, Ill.**

ICE JAM IN THE ROCKIES SHOWS THAT WELDED STEEL CAN TAKE IT

Courtesy of The Thompson Manufacturing Company, Denver, Colorado, who built this pipe line with Lincoln "Shield-Arc" Welding Equipment.

Looking toward broken outlet structure. Pipe crumpled where man stands.

SETTING. Santa Maria Reservoir on North Clear Creek near Creede, Colorado. Welded steel 84-inch pipe line 8100 feet long diverts water from creek into canal.

Looking from outlet structure showing washout and fallen pipe.

EVENTS. Outlet became jammed with ice. Backup caused overflow of water from concrete outlet structure, washing out a hole 24 feet deep. Span of pipe 60 feet long, full of water and ice, hung in mid-air until concrete structure was undermined. Pipe dropped, pivoted at a welded girth seam where it crumpled. Diameter of entire span of pipe was flattened down to about 72 inches.

RESULT. Not a single break occurred in pipe or welds. This confined the flow to the outlet and reduced washout damage. Flattened pipe was straightened out. Crumpled section was replaced with new pipe, welded in.

Point of bend occurred at a girth weld seam. It crumpled but did not crack.

MORAL. For maximum strength, ductility, tightness, engineering freedom and cost reduction, *specify "Shield-Arc" welded construction.*

For further details consult the nearest Lincoln office or mail the coupon.

LINCOLN

LARGEST MANUFACTURERS OF ARC WELDING EQUIPMENT IN THE WORLD

THE LINCOLN ELECTRIC COMPANY
Dept. G-582, Cleveland, Ohio

Send free copy of "Welding in Construction Work."

Name _____ Position _____

Company _____

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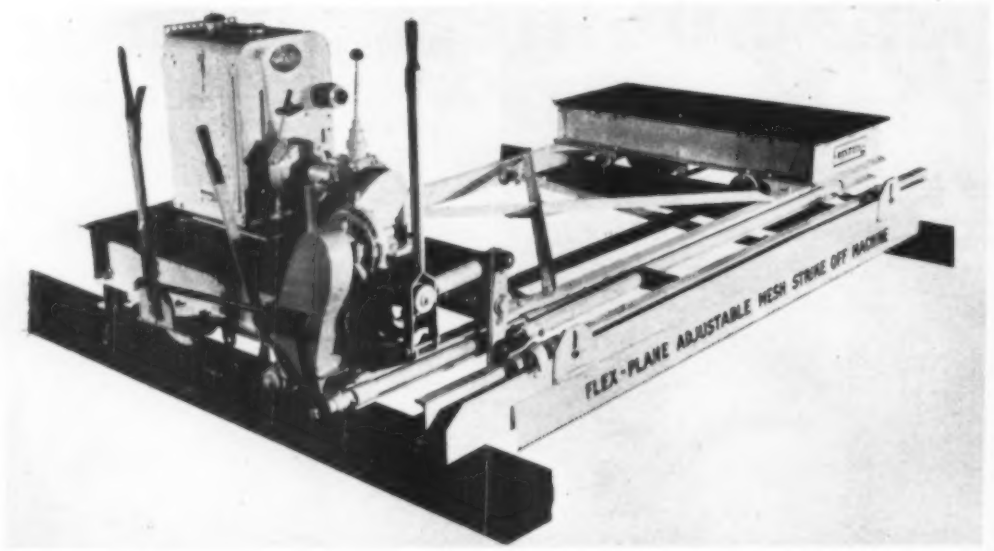
City _____ State _____



This is a photo of the "FLEX-PLANE" motorized mesh strikeoff machine; used in a number of States for striking off the concrete below the forms for mesh while the finishing machine is working somewhere in the rear — thus, eliminating delay to the contractor. The machine is built low; the mixer bucket can pass over the center. Both sides are of equal weight to give uniform traction. The power unit consists of a two cylinder 10 H.P. gasoline engine with various speeds. Machine is furnished in many widths with 2′ adjustments—Example: 20′ to 22′ roads or 10′ to 11′, etc.

FLEXIBLE ROAD JOINT MACHINE COMPANY
WARREN, OHIO.

Digging FAST and Digging DRY

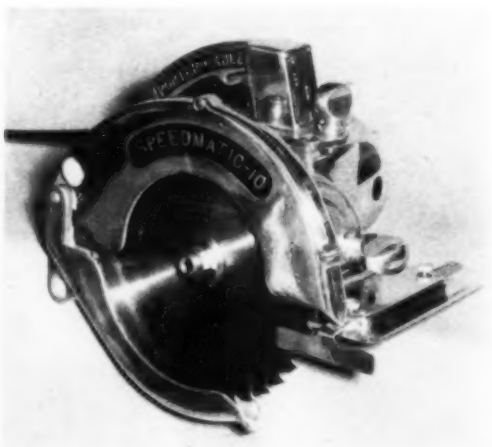
While a ONE HUNDRED PER CENT MORETRENCH WELLPOINT SYSTEM keeps the water out of sight—the mind at rest—and the right kind of balance on the books!

MORETRENCH CORPORATION
90 WEST STREET • NEW YORK

PORTABLE PIPE AND BOLT MACHINE designed for bench or stand use threads pipe up to and including 2 in. with solid full-width dies at speed of about 22 r.p.m. Threads bolts up to 1½ in. Operates geared tools to thread pipe up to 8 in. Inclosed gears run in oil. Anti-friction bearings. Conventional-

type geared chuck grips pipe from ⅛ to 2 in. and bolts from ¼ in. up. So designed that two men can conveniently work on it—one threading, other bending or making up fittings. Net weight, 140 lb.; height 12½ in. Base 18 x 18 in.; base dimension, mounted on legs, 42 x 46 in. Powered by ½-hp. Black & Decker universal motor.—**Beaver Pipe Tools, 370 Dana Ave., Warren, Ohio.**

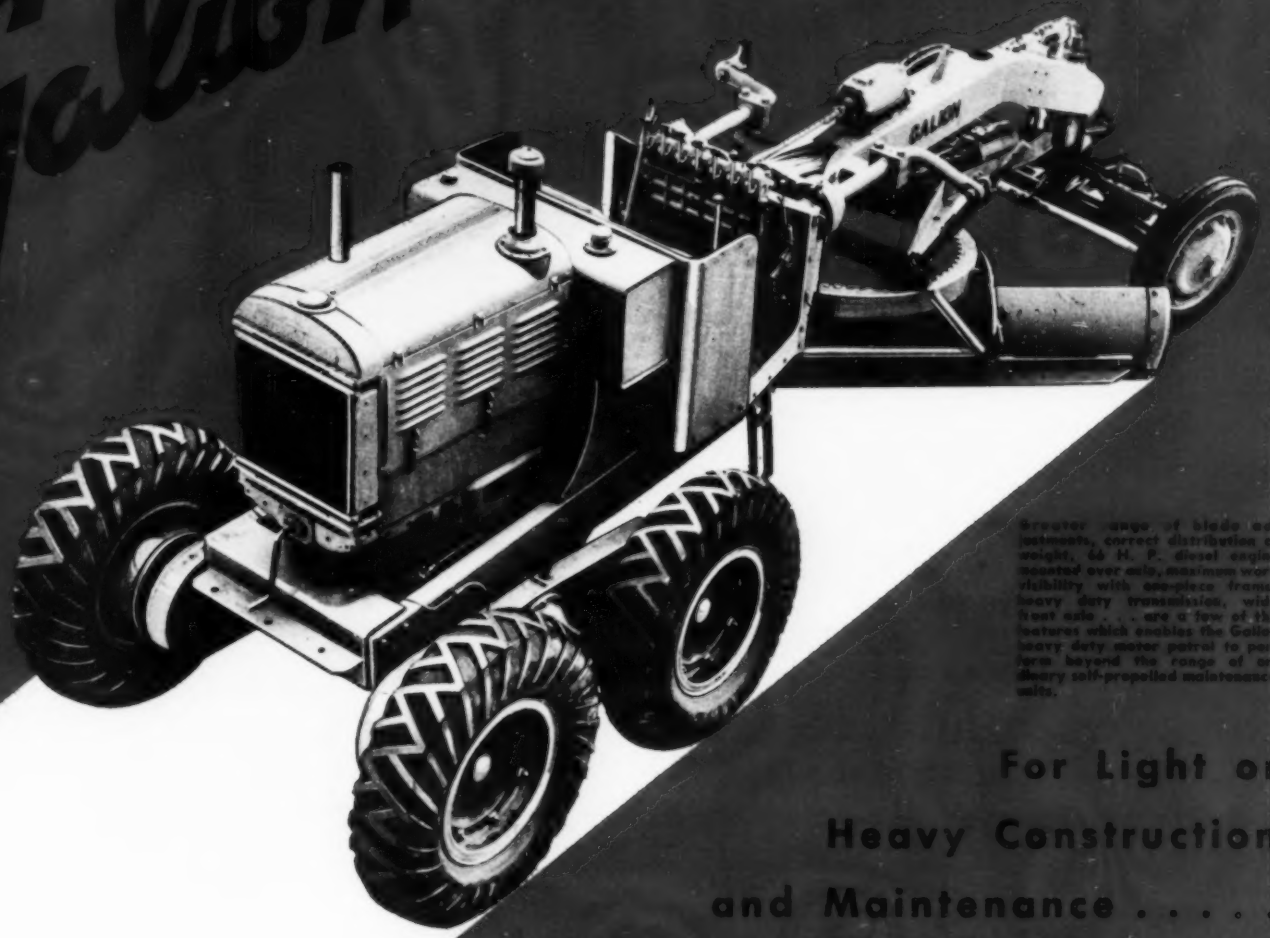
ELECTRIC HAND SAW equipped with 10-in. blade has cutting capacity of 3¾ in. and blade speed of 4,000 r.p.m. which results in faster, cleaner cutting. Use of helical cut gears results in more compact



electric hand saw with exceptionally even distribution of weight. Handle may be placed immediately above cutting point. Improved adjustment for cutting to any depth or any angle. Setup is quick; positive locking requires no wrenches. Large base or shoe permits new model to rest firmly on work, assuring safety and accuracy. With machine is provided rip gage which can be set required distance to guide saw from edge to stock.—**Porter-Cable Machine Co., Syracuse, N. Y.**

STREAMLINED EARTH-MOVER, called "Wheeler", for excavating and grading, is operated with rubber-tired Koehring tractor at speeds of 18 to 20 m.p.h. for traveling to and from dump. Wheeler utilizes

Galion MOTOR PATROLS



Greater range of blade adjustments, correct distribution of weight, 66 H. P. diesel engine mounted over axle, maximum work visibility with one-piece frame, heavy duty transmission, wide front axle . . . are a few of the features which enables the Galion heavy duty motor patrol to perform beyond the range of ordinary self-propelled maintenance units.

For Light or Heavy Construction and Maintenance . . . . .

With a choice of weight, power, final drive and special equipment, Galion offers a complete line of motor patrols suitable for any form of construction or maintenance work. Heavy duty models for heavy construction and maintenance; Master models for light construction and heavy maintenance; and Junior patrols for light and general maintenance work.

Investigate Galion motor patrols . . . you will find them capable of doing a modern job of road building and maintenance.

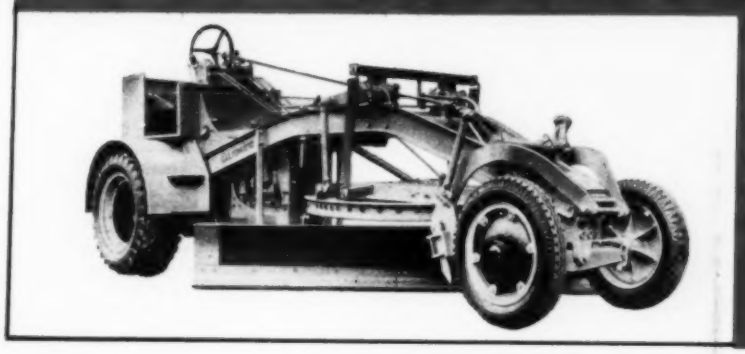
GALION ROAD MACHINERY

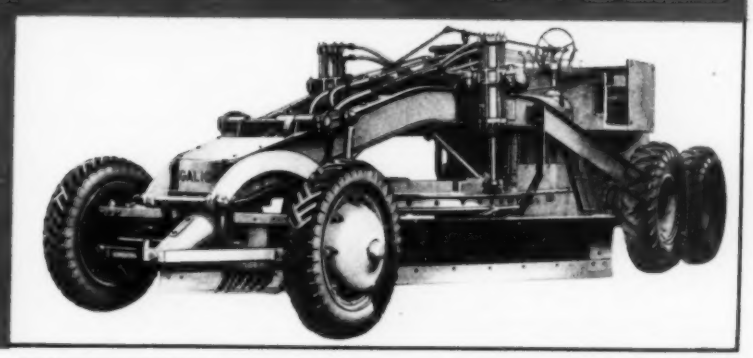
PULL GRADERS
ROAD ROLLERS
MOTOR PATROL GRADERS
SPREADERS
SANDERS

Left-below: Galion Junior power motor patrol. Right-below: Galion Master model motor power grader.

The Galion Iron Works & Manufacturing Company

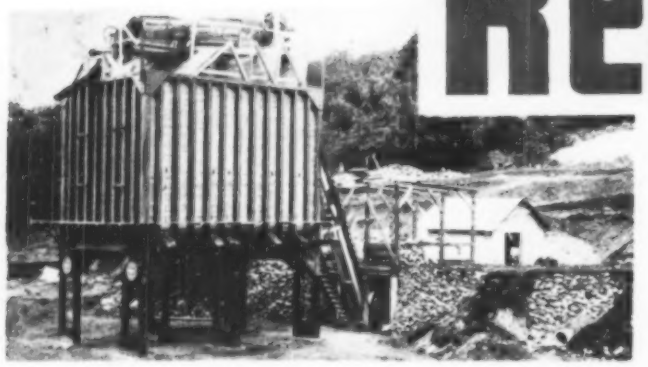
Main Office and Works: **Galion, Ohio** *Export Division:* **Columbus, Ohio**





Either way - make it a

Reliance



CRUSHING PLANT

A complete unit—rapidly set up, inexpensive to operate, insuring large capacity, very little vibration. Crushing, elevating, washing, screening done on spot, materials stored in Reliance Steel or Wood Bins (completely fabricated, easy to erect). Experienced contractors put these Reliance Units together quick to meet any job capacity — at a profit. You, too, will do well to investigate.

PORTABLE *with* V-BELT DRIVE

Whether you use this Reliance Portable Crusher alone or in combination with an Elevator, Chute Screen, etc., you can get no better value for your money in terms of capacity, low operating cost and rugged durability. The Reliance Crusher is famous for its strength and simplicity. It is particularly stable. A "swell" buy for crushing on any job. Send for detailed circular.

PRODUCTS:

Reliance offers a complete line of **Rock Crushers; Bucket Elevators; Revolving Screens; Storage Bins; Pulverizers; Chip Spreaders; Heating Kettles; Bin Gates; Feeders; Belt Conveyors; Grizzlies; Air Separators; Sand and Gravel Spreaders; Wash Boxes.**

UNIVERSAL ROAD MACHINERY COMPANY

KINGSTON, N. Y., U. S. A.

DISTRIBUTORS in ALL PRINCIPAL CITIES of U. S. A.

C.H.&E.

SMALL TANDEM ROLLERS

- **ARE SIMPLE, COMPACT AND ECONOMICAL**
- **TWO AND THREE TON SIZES**
- **FOUR CYLINDER POWER UNITS**
- **EASY TO OPERATE**

These rollers are ideal for blacktop driveways, tennis courts, etc., and for street patching.

Send for Bulletin RST-39

Also Pumps, Saw Rigs, Hoists — a full line of construction equipment.

C. H. & E. MANUFACTURING CO.

3847 N. Palmer St. Milwaukee, Wis.

Button-ease Control Eliminates Dump Body Levers in Truck Cab

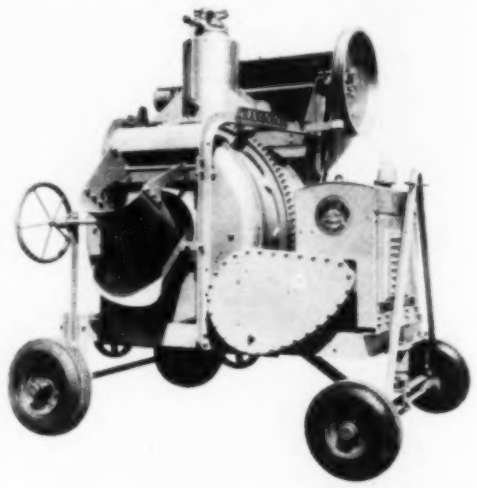
Button-ease Control, on dash, operates Power Take-Off. Another Button-ease Control, on floor, operates Hydraulic Hoist. No mutilation of cab, floor or mat. Ideal for dump body installations on C.O.E. as well as standard models. No extra cost. Only Hercules can give you these "years ahead" engineering achievements: Button-ease control, "Ezy-Reach" Tailgate Lever, Super-Power Center-Lift Hydraulic Hoist, and Tire-Tool Pack Dump Body. WRITE FOR LITERATURE!

HERCULES STEEL PRODUCTS CO.

GALION, OHIO, U. S. A.

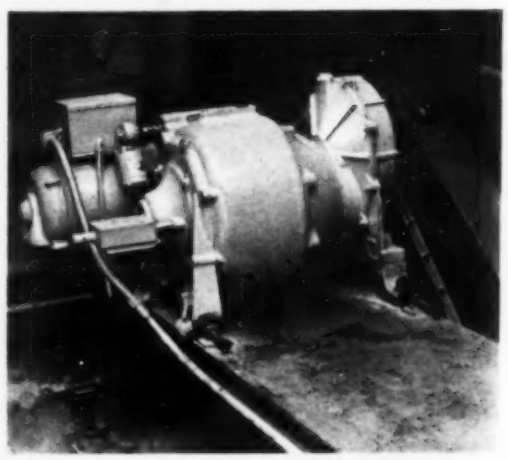
power of crawler push tractor for loading and unloading. In hauling position unit has 21-in. clearance, yet is flat on ground for easy loading. Short over-all length and wheelbase make possible complete turns on 20-ft. roadways. Tractor speed can easily be synchronized with that of crawler tractor. Only one push tractor necessary to assist in loading and unloading fleet of Koehring Wheelers. — **Koehring Co., 3025 W. Concordia Ave., Milwaukee, Wis.**

CONCRETE MIXERS. 7S and 10S, designed to assure for contractor-users greater economy, better mix, higher production and lower maintenance. Improvements: (1) One-piece chassis reinforced by four extra members for supporting drum and rollers

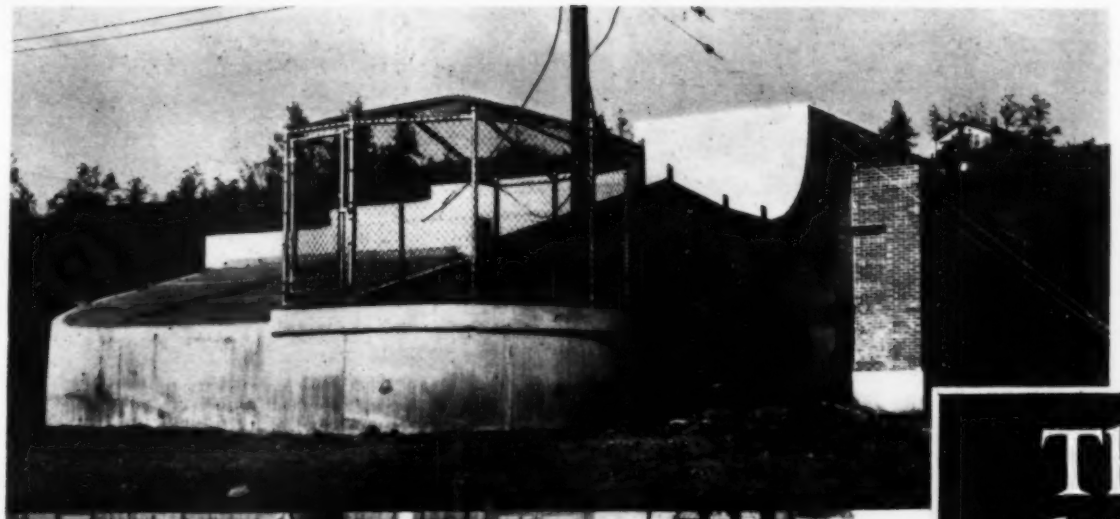


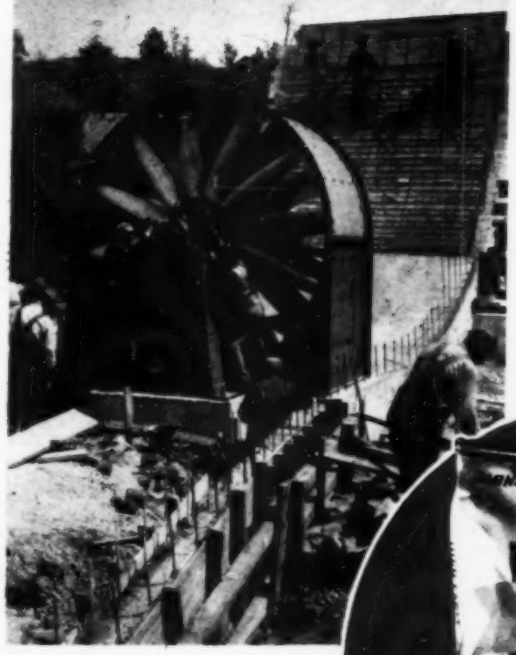
and providing additional degree of resistance against strain, wear and shock; (2) extra-heavy alloy-steel drum roller shafts compensate for wear on rollers and traction rings, assuring correct centering of drum; (3) exclusive mixing action with specially designed mixing blades; (4) positive water control at all times by spiral cut-off water tanks; (5) self-aligning bearings; (6) roller-chain drive protects gears from sudden shock of starting; (7) fully-inclosed, powerful engine; (8) screen-type air cleaner on motor; (9) centralized controls for quick and easy operation. Mixers may be had with two or four wheels for side or end discharge. Full spring suspension trucks. — **Ransome Concrete Machinery Co., Dunellen, N. J.**

SPEED CONTROL UNIT, called "Speed-Trol", superseding Sterling Vari-Speed motor, is designed for use in construction, mining and other industries to provide infinite speed variation over wide range. Simplicity of construction said to make possible



extremely fine adjustments down to fraction of revolution on drive shaft. Speeds are infinite and not by steps. Turn of conveniently located handwheel changes speed without holding up production. Variations, 2:1 to 6:1; ratings, ¼ to 15 hp. Furnished without motor or with a.c. or d.c. motors such as open, inclosed fan-cooled, pipe-ventilated, explosion-proof, two-, three-, or four-speed. Can be assembled with either single or multiple reduction gears making available any speed desired at output shaft. Remote or automatic control may be applied to Speed-Trol motor set in any position, shaft up or down. Use of Speed-Trol is said to improve products and decrease production costs by making available inexpensive system of machine drive. — **Sterling Electric Motors, Inc., 5401 Telegraph Rd., Los Angeles, Calif.**





Air Shaft:
Sloss Sheffield Steel & Iron Co.
Alden, Ala.
Mining Engineers and Contractors:
Salmon & Cowin, Inc.,
Birmingham, Ala.

There was *only one way* to do this job

Within the bounds of reasonable cost and efficiency, the concrete work for the interior of this air-shaft could only have been done with early strength cement.

Serving for both intake and return, the 12′ x 23′, 475′ deep shaft required a concrete dividing wall for the entire depth. Forms were designed for a 12′ pour daily. The forms and working platforms had to be handled by a hoisting engine on the surface. Every day waiting for concrete to cure and harden would have been idle time.

Because Lehigh Early Strength Cement was used, there was no delay. Every day, a twelve-foot section was poured. Every 24 hours the forms were moved. This routine cycle was accomplished without the slightest interference. The engineers said: "Obviously we could not use normal cement on this work."

In 24 to 48 hours, with Lehigh Early Strength Cement, you get cured and hardened concrete comparable to the 7-day strength with normal portland cement. Often absolutely necessary, this speed is also advantageous wherever shortened curing time will save form costs, reduce construction time and overhead expense. At this season the speed of Lehigh Early Strength Cement will offset retarded curing because of cool nights and variable days.

Consult the Lehigh Service Department for information on the use of Lehigh Early Strength Cement for any specified purpose.

LEHIGH
EARLY STRENGTH
CEMENT

LEHIGH PORTLAND
CEMENT COMPANY
Allentown, Pa. Chicago, Ill. Spokane, Wash

Answers to your problems in structural engineering always at your finger tips

EVERY man concerned with the design and construction of civil engineering structures of any type should have these practical books with their helpful tables, diagrams, reference data, best methods and details.

Hool and Kinne's

Structural Engineers' Handbook Library

6 Volumes—3575 pages—fully illustrated

THE most valuable library obtainable for any man concerned with the design and construction of civil engineering structures of any type.

Under the general editorship of George A. Hool, formerly Professor of Structural Engineering, University of Wisconsin; and W. S. Kinne, Professor of Structural Engineering, University of Wisconsin, Editors-in-Chief of the Library, *Sixty-Six* of the leading, practical operating structural engineers of the United States and Canada give you the very cream of their knowledge of structural engineering.

They give you six well bound, fully illustrated volumes, containing 3,575 pages of practical, authoritative information covering every phase of structural engineering from foundation and substructure work to the completed erection.

Every man concerned with the design and construction of civil engineering structures of any type should have these practical books with their helpful tables, diagrams, reference data, best methods information and details. The six books are:—1. Foundations, Abutments and Footings. 2. Structural Members and Connections. 3. Stresses in Framed Structures. 4. Steel and Timber Structures. 5. Movable and Long-Span Steel Bridges, and, 6. Reinforced Concrete and Masonry Structures. With these books on hand you cannot make mistakes.

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C.M. 4-39

NEWS FROM MANUFACTURERS *About Their Products*

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.

CONTRACTORS' PUMPS — **RALPH B. CARTER CO.**, 53 Park Place, New York, N. Y. (16 pp., illustrated.) Bulletin No. 1040 covers complete line of Humdinger self-priming centrifugal pumps for contractors. Sizes from 2 in. to 8 in. Tables give capacities in gallons per minute against various heads, including friction. Impellers are of special alloy to resist abrasive wear. Powered by gasoline engines. Mountings include wheels with flat steel or pneumatic tires. For handling caisson dewatering there is a vertical self-priming caisson pump. Also centrifugals with electric drives and a high pressure jetting pump. Included in the line are diaphragm and plunger pumps.

• • •

ELECTRIC TOOLS — **United States Electric Tool Co.**, Cincinnati, Ohio. (36 pp., illustrated; 3½x6¼-in. size). Condensed catalog covering complete line of portable, bench and floor types of electric tools. Includes electric hand drills in sizes from ¼ to 2 in.; rotary brushes; rotary hack saws; valve refinishing machines; portable sanders and surfacers; grinders; saws and screwdrivers. Prices are listed for each type and size of tool.

• • •

WATER SUPPLY SYSTEM — **Lock Joint Pipe Co.**, Ampere, N. J. (16 pp., illustrated.) Design and construction of new gravity supply of soft water for Little Rock, Ark., including rolled earth dam, model spillway and manufacture and installation of 32 mi. of 39-in.-diameter reinforced-concrete pressure pipe.

• • •

WELDING OF WROUGHT IRON — **A. M. Byers Co.**, Pittsburgh, Pa. (16 pp., illustrated.) A revised service bulletin embodying recommended procedures to follow when welding wrought iron by commonly used processes. Characteristics of wrought iron that influence weldability. Covers plastic, fusion, oxyacetylene, metallic arc and carbon arc types of welding. Discussion of physical properties of welds.

• • •

SAFETY WORK SHOES — **Lehigh Safety Shoe Co.**, Allentown, Pa. (8 pp., illustrated.) Complete technical information and illustrations of 41 models of steel-toe safety work shoes, designed for maximum wear. In addition to armored feature, some models have anti-skid grid rubber or cross-cord soles. Also high-cut leather shoes and safety rubber knee-boots.

• • •

HOSE — **The DeVilbiss Co.**, Toledo, Ohio. (32 pp., illustrated.) Contains full information on their complete line of hose for all requirements. Traces the product from the baled crude rubber through the DeVilbiss hose factory and testing laboratory to its various finished forms. These include spray-painting, air and fluid hose, service station air, water, gasoline and brake hose with solvent-resisting liner, welding and pneumatic tool hose and other special types designed and manufactured to meet the special demands of exacting jobs. The complete line of hose connections, valves, couplings and adapters manufactured by the company is also included. Full specifications are listed with each type of hose illustrated, as well as much valuable information to aid in the selection of the right hose for the right job.

PORTABLE BELT CONVEYORS AND UNLOADERS — **Fairfield Engineering Co.**, Marion, Ohio. (Four 8-12-pp. bulletins, illustrated). In four separate bulletins are described and illustrated the company's: (1) portable troughed belt conveyors and sectional belt conveyors for handling sand, gravel, crushed stone, mixed concrete, earth, cinders, etc.; (2) power moved conveyors and car unloaders for coal and coke; (3) special unloading equipment for use with radial storage bins; portable conveyors and car unloaders. The portable troughed belt conveyors are built in lengths from 20 to 60 ft. and are powered either by electric motors or gasoline engines. Standad belt widths are 14, 18 and 24 in. Machines are mounted on two-wheel, ball-bearing carriages. Condensed specifications for each machine.

• • •

AIRPORT FACILITIES — **R. G. Le Tourneau, Inc.**, Peoria, Ill. (8 pp., illustrated). Booklet tells how every community may enjoy benefits of first class airport facilities. Actual job photographs show government agencies and private companies most economical means of staying on "air map."

• • •

DIESEL ENGINE PERFORMANCE — **Cummins Engine Co.**, 1713 Wilson St., Columbus, Indiana. (18 pp., illustrated.) Job test evidence of the economy, low maintenance cost and dependability of Cummins diesel engines in construction service is presented in this booklet. Specific examples of contractors and construction companies are cited to show that these engines are (1) cheaper to run; (2) cheaper to service; and (3) cheaper to own. Kind of work covered includes truck haulage, transit-mixers, power shovel and dragline excavation. Well-known contractors using diesel engines are listed. The company's complete line of diesels includes 43 models ranging in capacity from 50 to 500 hp.

• • •

PORTABLE ELECTRIC TOOLS — **Van Dorn Electric Tool Co.**, Towson, Md. (57 pp., illustrated.) Covers entire line of 114 different portable electric tools, including drills, hole saws, screw drivers, nut runners, tappers, saws, hammers, shears, grinders, sanders, surfacers, etc. Drill sizes range from 3/16 in. to heavy-duty 1 ½-in. and portable saws from 5 to 10. Alphabetical index simplifies reference to particular types of tool, and prices are given for each tool. Electric motors are of universal type, running on either a.c. or d.c.

• • •

ALUMINUM HOUSE PAINT—**Aluminum Co. of America**, Pittsburgh, Pa. (28 pp., illustrated.) Booklet entitled "Fifteen Years Behind the Brush" describes use of aluminum house paint for wood priming. Advantages claimed are the properties of the drying oils and resins used in making this paint and the great elasticity of the dried film. Formula prepared to meet all the peculiar properties of wood surfaces. When used as primer for lumber, aluminum flakes that make up pigment act to protect long-lived vehicle of paint mixture and give permanence to its moisture-proofing properties and elasticity. Economy of aluminum house-paint system is discussed and suggestions are given on where and how to use it.

• • •

CHAIN DRIVES — **Link-Belt Co.**, 307 N. Michigan Ave., Chicago, Ill. (48 pp., illustrated.) Engineering data book No. 1645 deals with Silverstreak silent chain and Silverlink roller chain drives for automotive and stationary engines (timing and accessory driving). The foreword says: "The data contained in this book will be found useful in designing drives for gasoline, oil, diesel, and steam engines, and in laying out convenient efficient, durable, and quiet driving connections between crankshafts, camshafts, fanshafts, generators, magnetos, compressors, blowers, governors, etc."

• • •

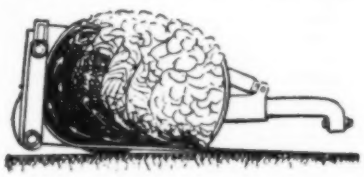
VIBRATING SCREEN — **Productive Equipment Corp.**, 4600 South Kedzie Ave., Chicago, Ill. (4-p. folder, illustrated.) Positive eccentric type screen on Selectro unit imparts uniform gyrating circle-throw motion to entire screening surface. Stroke is adjustable to eight intensities. Quick tilting to 40 deg. from horizontal. Machines available in one, two or three decks.

Making the News!

Chicagoans Times
FINAL EDITION
FLAT DIGGING ANGLE MAKES NEW BAKER HYDRAULIC SCRAPERS FAR MORE EFFICIENT
FASTER LOADING
LESS POWER NEEDED
SMOOTHER GRADING
AUTOMATIC REAR CLEARANCE
Users Report More Pay Loads at Less Cost!

BAKER HYDRAULIC SCRAPERS

BUILT IN SIZES FOR USE WITH 20 H.P. TRACTORS UP



Showing FLAT ANGLE DIGGING. The earth passes to the rear first, requiring less power to load to capacity.

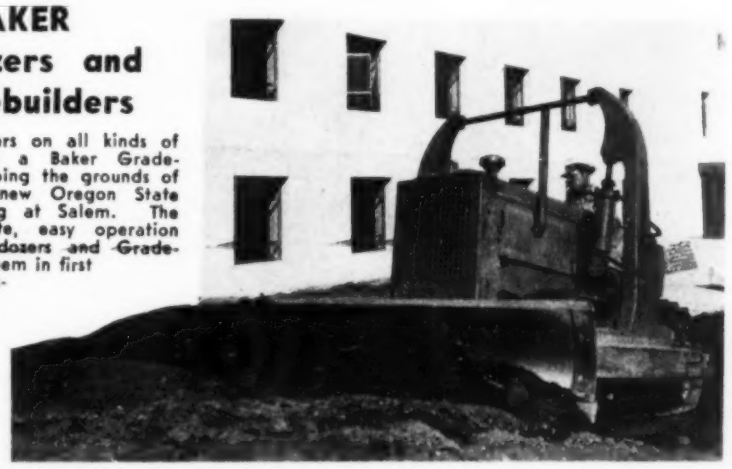
Write for latest Bulletins on Scrapers, Bulldozers and other Baker equipment.

THE BAKER MFG. CO.
568 Stanford Avenue
SPRINGFIELD, ILLINOIS

Baker Hydraulic Scrapers are making the headlines in the earth moving field today. Contractors and road officials are turning to Bakers because they embody new engineering features that have been proved more efficient. The Baker principle of flat angle digging means more full loads . . . smoother, cleaner grades . . . at less cost. Fully tested on many tough jobs, Baker Hydraulic Scrapers are leading the way to better, cheaper earth moving. Be sure to get complete information about Bakers before you decide.

BAKER Bulldozers and Gradebuilders

You'll find Bakers on all kinds of jobs. Here is a Baker Gradebuilder landscaping the grounds of the beautiful, new Oregon State Capitol building at Salem. The smooth, accurate, easy operation of Baker Bulldozers and Gradebuilders keeps them in first place in the estimation of earth movers everywhere.



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BULLDOZERS • GRADEBUILDERS • SCRAPERS • ROOTERS • ROAD DISCS • MAINTAINERS • SNOW PLOWS

SMOOTHER SERVICE . . . CLOSER CONTROL with J-M BRAKE LININGS AND CLUTCH FACINGS . . .

THERE'S a good reason why most of your new machinery comes factory-equipped with J-M Friction Materials. Manufacturers recognize that draglines, shovels and cranes represent your major investment. Therefore, to assure long, dependable service, they safeguard them with materials that promise maximum efficiency, minimum maintenance.

On the job, J-M Materials back up this promise. Uniformly high in quality, they provide easier load contrpl in any service. Brake and clutch operation is smoother, safer. And the great strength and durability of J-M Materials assure long life . . . economical service.

You can maintain this same dependable service by specifying J-M Materials whenever replacements are needed. For, no matter how tough your requirements, you can meet every one with J-M Friction Materials. For details, write Johns-Manville, 22 East 40th Street, N. Y. C.

THE LEHIGH NAVIGATION COAL CO. increased their service hours by more than 54% when they switched to Johns-Manville Brake Blocks. Including labor and other factors, the annual brake-block costs were reduced 24%.

Johns-Manville

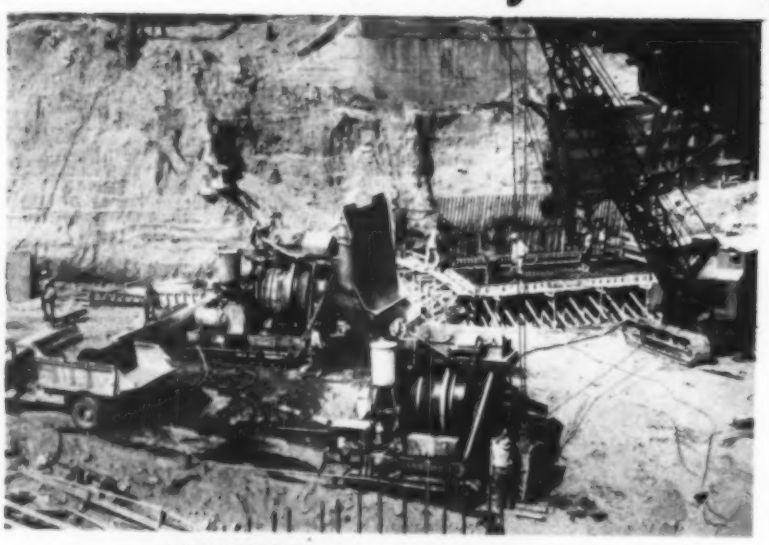
INDUSTRIAL FRICTION MATERIALS

RANSOME

IF YOU WANT THE *LATEST*

In Paver Design—

RANSOME



16 RANSOME Pavers used on this project.

It will prove of considerable value and interest to you, to investigate the many new features embodied in RANSOME 27-E Single and "Dual Drum" Pavers. Learn what these Pavers now equipped with HYDRAULIC CONTROL and AUTOMATIC HYDRAULIC FEATURES will do for you.

Write for all the facts. **RANSOME CONCRETE MACHINERY CO.**
Dunellen, New Jersey

Ransome **27-E SINGLE and "DUAL DRUM" PAVERS**

DESIGN & CONSTRUCTION BASED ON 89 YEARS EXPERIENCE

LARGE SEMI-PORTABLE COMPRESSOR — **Sullivan Machinery Co.**, Michigan City, Ind. (12 pp., illustrated.) Complete specifications for WN-102 unit, available in three sizes of 445, 550 and 750 cu.ft. of free air per minute. Designed for heavy construction, tunneling and quarrying. Graphic tables indicate number of tools (drifters or hand held drills) that can be operated from each size of compressor. Stock combinations include direct-connected and V-belt driven models with gasoline, diesel and electric drive. Phantom views in Bulletin A-23 illustrate mechanical details. Among features is "dual-cushion" valves whose operation is fully explained.

• • •

VISIBLE RECORD EQUIPMENT—**Acme Card System**, 8 South Michigan Ave., Chicago, Ill. (8 pp., illustrated.) Describes great variety of Flexoline equipment and forms for every kind of listing, index or reference record, including accidents, budget, costs, employee social security records, equipment, depreciation, insurance, purchases, stock, inventory, etc. Forms are 8x5 in. in size designed for use in visible card index files.

• • •

ELECTRICAL DEVELOPMENTS OF 1938 — **General Electric Co.**, Schenectady, N. Y. (55 pp., illustrated.) Summary by Guy Bartlett, of electrical progress in fields of power generation and transmission, industrial equipment, transportation, domestic applications, illumination and research. Of particular interest to the construction industry are the sections on motors, control, welding, meters and instruments, illumination (highway and floodlighting).

• • •

ROAD MACHINERY — **Austin-Western Road Machinery Co.**, Aurora, Ill. (24 pp., illustrated.) General catalog covering, among other items of equipment, the 1939 model motor grader, with large 13.50 low pressure tires, which drives and steers on all four wheels; two new scrapers of 8- and 12-yd. capacities; patrol sweeper which cleans a width of 5½ ft. at a time; and the 1939 model Badger ½-yd. power shovel with oversize clutches and other improvements. Specifications for various machines are presented in tabular form. To indicate the advance that has been made in the design and construction of modern road machinery the catalog contains, for purposes of comparison with its 1939 models, illustrations of some of its equipment manufactured more than 40 years ago.

• • •

WELDING AND CUTTING EQUIPMENT — **Air Reduction Sales Co.**, Lincoln Building, New York, N. Y. (32 pp., illustrated.) Catalog 22 covers hand welding and cutting torches and tips, pressure regulators, fluxes, rods and other supplies. Eight complete outfits covering the entire range of industrial uses are shown, and in addition will be found valuable information and illustrations of portable oxygen and acetylene manifolds, circular cutting attachments, cylinder trucks, torch extensions, etc.

Catalog 21 (64 pp., illustrated) is designed to assist the large user of oxy-acetylene equipment and electric arc welding machines. In addition to those items in Catalog 22, it contains additional information dealing with acetylene generators, industrial gases, and oxy-acetylene machines. Several pages also are devoted to pipe line safety devices, two pages to National Carbide, and two to Wilson arc welders, "the machines that make the arc behave."

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STEEL ROOFING PRODUCTS—**Republic Steel Corp.**, Cleveland, Ohio. (32 pp., illustrated.) Information on special and standard steel roofing products. Many styles and products of roofing are illustrated and described. These include, in addition to such specialties as triple drain roofing and accessories, super-dry roofing and Taylor roofing ternes, V-crimped roofing, self-capping roll roofing, roll and cap roofing and corrugated roofing. Two other products, outside of the roofing products field, are highlighted — Galvannealed sheets and Enduro stainless steel sheets. Complete tabular information is incorporated covering standard weights per square, in pounds; estimating table for roofing products;; allowances for laps on corrugated sheets; extras on galvanized or painted roofing and siding; and bundling tables for galvanized flat sheets.

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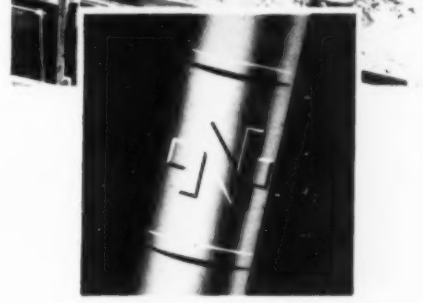

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POWER SHOVELS AND CRANES—**Bay City Shovels, Inc.**, Bay City, Mich. (32 pp., illustrated.) General catalog marking company's 25th anniversary and reviewing development and progress during that period of complete line of convertible shovels in sizes from ⅜ to 1¼ cu.yd. Crane capacities range up to 20 tons. Also featured are dragline buckets and a new line of single purpose and deck-type trailers. Condensed specifications, working ranges and job pictures. One section of booklet is devoted to "Precision Workmanship" in company's shops.

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TRUCK SIZE AND WEIGHT RESTRICTIONS — **Four Wheel Drive Auto Co.**, Clintonville, Wis. (53 pp., pocket size, 3¾x7¼ in.) Useful compilation of data for year 1939 covering size and weight restrictions for motor trucks and trailers in each state. This comprehensive summary of state road laws, presented in tabular form, should be invaluable to owners of trucks, especially those whose operations extend beyond the boundaries of a single state.

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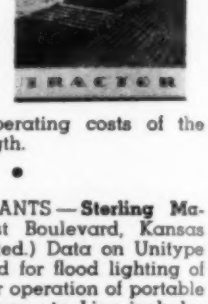
DIESEL TRACTOR — **Caterpillar Tractor Co.**, Peoria, Ill. (32 pp., illustrated.) Economies, advantages and capacities of the Caterpillar diesel D4 tractor. Drawbar horsepower, 35; weight, 10,020 lb. for 60.-in. gage and 9,770 lb. for 44-in. gage. Four cylinder engine operating at 1,400 r.p.m. Cutaway photographs, printed in two colors, show the principles of the tractor's diesel engine, its fuel system and operation. Separate chapters are also devoted to the transmission, final drive and tracks. In addition, the jobs the D4 will do, and the approximate operating costs of the tractor, are considered at length.



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ELECTRIC GENERATING PLANTS — **Sterling Machinery Corp.**, 405 Southwest Boulevard, Kansas City, Mo. (4-p. folder, illustrated.) Data on Unitype electric power plants designed for flood lighting of night construction work and for operation of portable electric tools such as drills, saws, etc. Line includes both battery-charging units for lighting and units in which power is supplied directly by generator. Electric starting and remote control. Generators operated by gasoline engines. Size range is from 100 to 1500 watts, and plants are available for both alternating and direct current.

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CONCRETE VIBRATORS—**White Manufacturing Co.**, Elkhart, Ind. (4-p. folder, illustrated.) Improved features of White vibrators for mass concrete, operated by either gas engine or electric motor, include flexible shaft with vibrator head, connected to power unit by piano steel wire drive shaft, internal rotors incased in alloy steel head, interchangeable driving sections of 7-ft. standard length, abrasion-resistant rubber outer drive casing, full releasing Twin Disc clutch, V-belt countershaft. Accessories include grinding spindles, drill chucks, hammers, floats and screed vibrators.

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ROAD MARKER — **Meili-Blumberg Corp.**, New Holstein, Wis. (4-p. folder, illustrated.) Describes machine equipped with moving stencil for center-line striping of highways. No splashed paint along edges. Device is mounted on car or truck. Marks 6 to 10 mi. of highway per hour. Either single or double line. Gear-type pump feeds paint to spraying element of marker at rate of 5 g.p.m., bypassing 80 per cent back to tank to assure recirculation and thorough agitation.

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BALANCED ROCK CRUSHER — **Straub Manufacturing Co.**, 531 Chestnut St., Oakland, Calif. (8 pp., illustrated.) Faster and finer crushing is claimed for new Kue-Ken balanced machine in which two opposed jaws, pivoted at the top both swing freely like pendulums, with practically no lifting action. Rocks are instantly gripped and thrust down without abrasion, crushed and released. Dynamically balanced shaft. No flywheel. Long sizing zone at lower end to give finished product. Changing from one crusher product size to another is done in less than 3 min. Standard sizes of crusher range from No. 10 unit receiving rock 10x5 in. in size to No. 150 capable of receiving rock 48x16 in.

WIRE ROPE — **Broderick & Bascom Rope Co.,** 4203 North Union Boulevard, St. Louis, Mo. (96 pp., illustrated.) This booklet contains not only the usual price list, but also has many pages of data as to stresses in suspended cables, stresses in hoist and incline ropes and specific recommendations as to grades and constructions of rope for various types of power shovels, cranes, derricks, earth-moving and other equipment. There are notes on the causes necessitating the premature discard of rope. Section on general information on wire rope covers grades of steel, how wire is drawn, and rope is made, rope design, selection of wire rope and proper working loads and sizes of sheaves and drums.

• • •

PLYWOOD PANELS — **Resinous Products & Chemical Co., Inc.,** 222 West Washington Square, Philadelphia, Pa. (31 pp., illustrated.) Describes method of producing quality plywood by hot-bonding process wherin component layers are permanently fused together with dry sheets of synthetic resin or with a liquid bonding agent. Flat bonded veneer assemblies range from 2-ply (1/32 in.) to 52-ply (7/8 in.) For concrete forms and building construction Douglas fir is the material generally employed for the bonded plywood. Curved forms can be produced for special purposes.

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CONCRETE CURING — **Dow Chemical Co.,** Midland, Mich. (4-p. folder, illustrated) Faster curing of concrete and release of forms with Dowflake calcium chloride used as a solution or dry in the mix. Also increases workability of concrete and holds volume changes to minimum.

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SMALL DIESEL ENGINES — **Northill Co., Inc.,** Los Angeles, Calif. (8 pp., illustrated.) Industrial applications of 2-cylinder, 4-cycle, 15-20 hp. Covic diesel engine, weighing only 385 lb. and measuring 19 in. in length, 19½ in. in height, and 30⅝ in. in width. Starting by hand or electric starter. Opposed cylinder pancake design gives perfect balance. Run at 500 to 3,000 r.p.m. Compression ratio, 16:1. No spark plugs. May be used as generator sets, power units for construction or industrial equipment, or as power plants for small trucks and tractors.

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ENGINEERING IN TIMBER — **Timber Engineering Co.,** subsidiary of National Lumber Manufacturers' Association, 1337 Connecticut Ave., Washington, D. C. (20 pp., illustrated.) Pictorial review of wood construction with Teco connectors, portraying new era in use of timber as an engineering material. This booklet tells in 137 pictures the story of 110 heavy construction projects built of wood and employing timber connectors. Among projects represented are schools, gymnasiums, grandstands, bleachers, skating rinks, lookout towers, radio towers, tank towers, oil derricks, ski jumps, bridges, auditoriums, churches, theatres, orchestra shells, coal docks, roundhouses, piers, loading docks, airplane hangers, ice arenas, distillery barrel racks, packing houses, warehouses, garages, storage sheds, market sheds, planing mills, exposition buildings, CCC camps, and portable houses. "Engineering in Timber" graphically depicts how an age-old material has been streamlined to meet the modern trends of present-day construction.

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WELDER'S TROUBLE SHOOTER — **Westinghouse Electric & Mfg. Co.,** East Pittsburgh, Pa. (8 pp., vest-pocket size, 3½x6½ in.) Information in convenient tabular form covering in three parallel columns a wide range of (1) welding troubles, (2) their causes and (3) their cures. Among the subjects are brittle joints, cracked welds, incomplete penetration, poor fusion, porous welds, spatter and welding stresses. The welding operator will find in this booklet practical information which should aid him in producing satisfactory welds.

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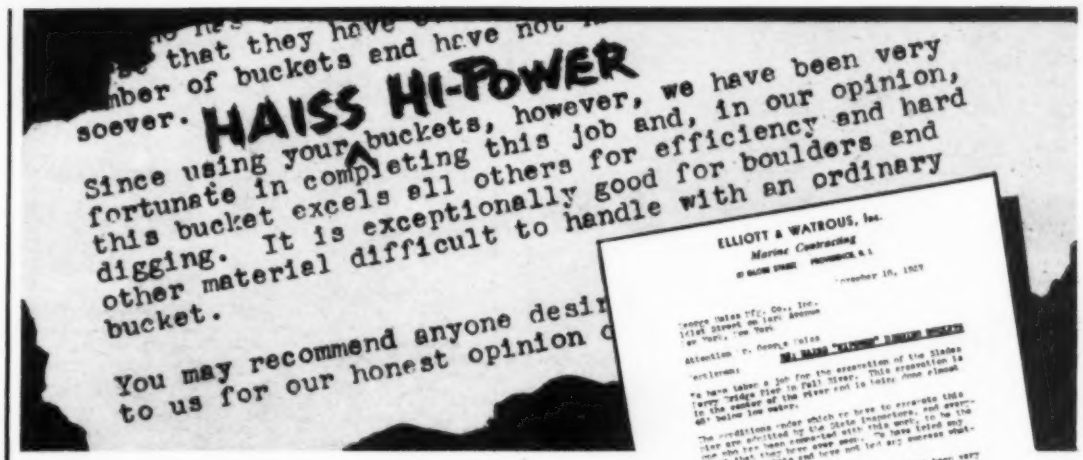
COLORING CONCRETE FLOORS — **Master Builders Co.,** 7016 Euclid Ave., Cleveland, Ohio. (4-p. folder, illustrated.) Describes Colormix—KuroKrome method of installing and finishing colored concrete. Coloring is done with fine dry powder of intense dyeing power, and surface is finished with penetrating sealer brushed into freshly laid floor.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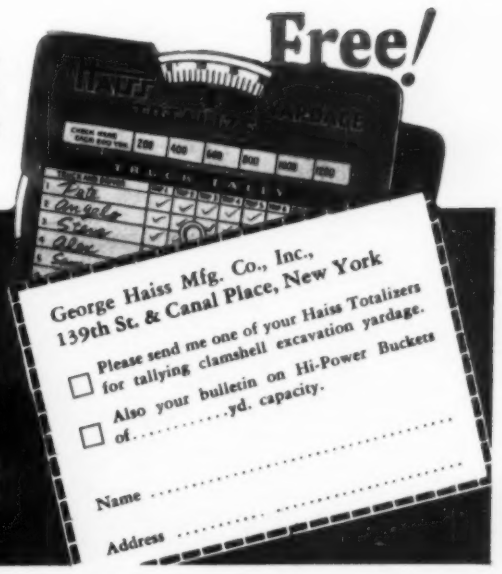
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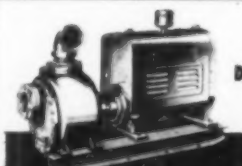
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Allis-Chalmers Mfg. Co. Center Spread
American Bosch Corp. 11
American Cable Div. of American Chain & Cable Co. ....3rd Cover
American Hoist & Derrick Co.. 22
American Steel & Wire Co. 26
Ames Baldwin Wyoming Co.... 70
Athey Truss Wheel Co. 21
Atlas Powder Co. 24
Austin-Western Road Machinery Co. 72, 73

Baker Mfg. Co. 101
Barber-Greene Co. 69
Bay City Shovels, Inc. 10
Bethlehem Steel Company 71
Blaw-Knox Company 31
Buckeye Traction Ditcher Co... 75
Bucyrus Erie Co. 28, 93
Byers Machine Co. 12

Carnegie-Illinois Steel Corp....103
Caterpillar Tractor Co. 14, 15
Chain Belt Co. 89
C H & E Mfg. Co. 98
Chevrolet Motor Co. 91
Cleveland Tractor Co. 8, 9
Coffing Hoist Co. 86
Columbia Steel Co. 103
Complete Machry. & Equip. Co., Inc. 106
Construction Machinery Co. 78
Cummins Engine Co....2nd Cover

Dixon Valve & Coupling Co... 76
Douglas Fir Plywood Ass'n.... 87
Du Pont De Nemours Co. Inc., E. I. 83

Ensign-Bickford Co. 78
Euclid Road Machinery Co. 7

Flexible Road Joint Machine Co. 96

Galion Iron Works & Mfg. Co. 97
General Motors Truck & Coach Div., Yellow Truck & Coach Mfg. Co. 79
Goodall Rubber Co. 90
Gorman-Rupp Co. 86
Griffin Wellpoint Corp. 106
Gulf Refining Co. 30

Haiss Mfg. Co., Geo. 105
Harnischfeger Corp. 16
Heil Company, The .....4th Cover
Heltzel Steel Form & Iron Co 88, 104
Hercules Steel Products Co., Inc. 98
Hetherington & Berner, Inc..... 94
Hobart Brothers 106

Insley Mfg. Corp. 92
International Harvester Co..84, 85

Jaeger Machine Company...13, 68
Johns-Manville Co. 102

Koehring Company, The 65

L & M Mfg. Company.....106
La Plant-Choate Mfg. Co. 18
Lehigh Portland Cement Co.... 99
Leschen & Sons Rope Co., A.. 81
Le Tourneau, Inc., R. G. 19
Lincoln Electric Co. 95
Link-Belt Company 25
Lone Star Cement Corp. 5

Mall Tool Co. 94
Marion Steam Shovel Co. 27
Martin Decker Corp. 78
McGraw-Hill Book Co., Inc.82, 100
Michigan Power Shovel Co.... 80
Mine Safety Appliances Co..... 64
Moretrench Corp. 96

Northwest Engineering Co. 20
Novo Engine Co. 29

Onan & Sons, D. W. 94
Owen Bucket Co. 86

Ransome Concrete Machinery Co. 102
Rogers Bros. Corp. 88

Searchlight Section 106
Service Section 106
Skilsaw, Inc. 82
Standard Oil Co. of California 66, 67
Standard Oil Co. of Indiana... 23
Stanley Works 104
Sterling Machinery Corp.....106

Texas Company, The 6
Templeton, Kenly & Co.....104
Thermoid Company 74
Thew Shovel Co. 32

U. S. Steel Corp. Subsidiaries 26, 103
Union Metal Mfg. Co., The... 77
United Hoisting Co., Inc.....106
Universal Road Mach'y Co..... 98

Wellman Engineering Co. 70
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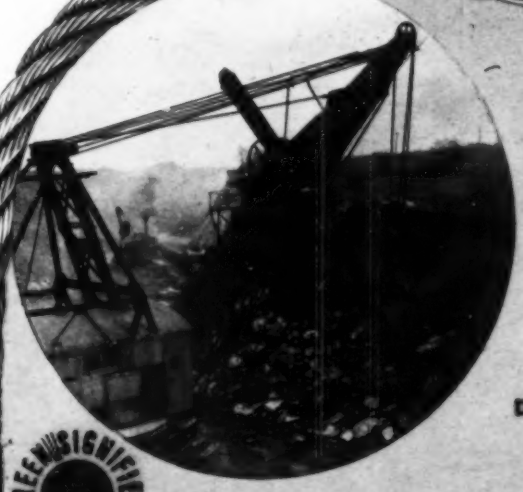

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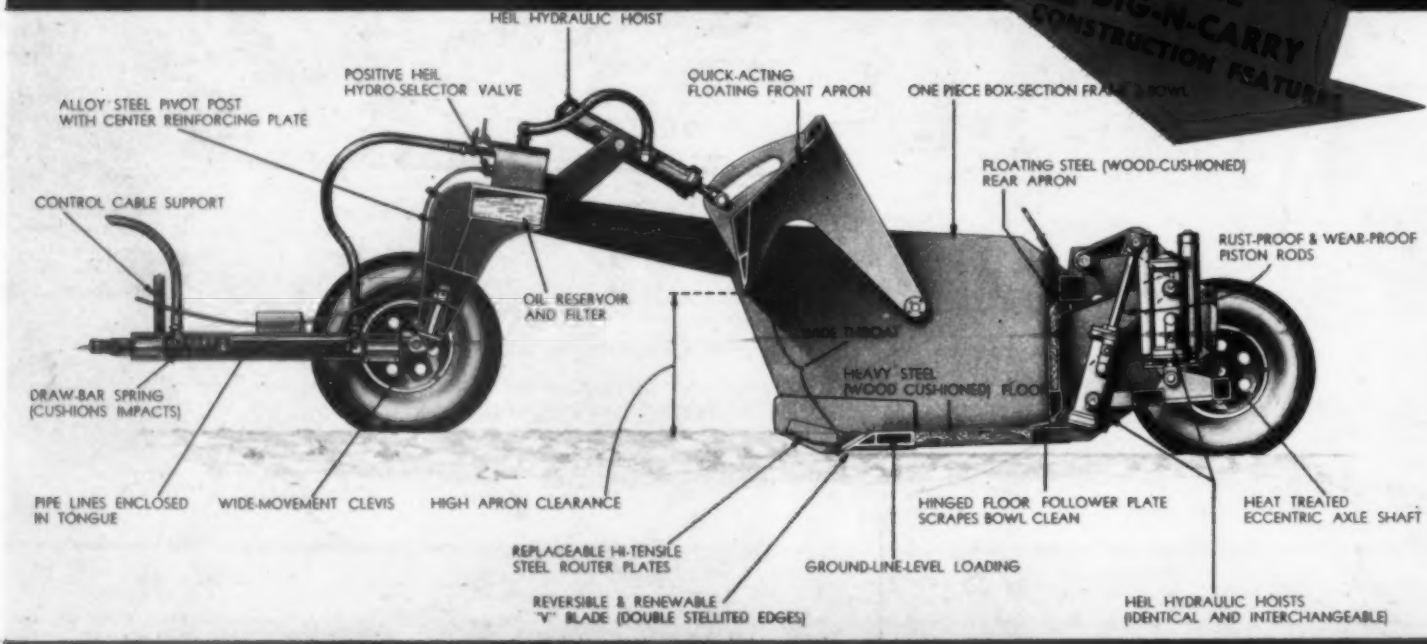
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